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Political, Racial,  
and Differential Psychology

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THE EXPERIMENTAL MEASUREMENT OF A SOCIAL  
HIERARCHY IN *GALLUS DOMESTICUS*: II. THE  
IDENTIFICATION AND INFERENTIAL MEAS-  
UREMENT OF SOCIAL REFLEX NO. 1 AND  
SOCIAL REFLEX NO. 2 BY MEANS OF  
SOCIAL DISCRIMINATION<sup>1 2</sup>

*From the Psychological Laboratories of Clark University*

---

CARL MURCHISON

---

The first paper in this preliminary series (1) narrated the general story of this method of attack on the time and space measurement of social phenomena. A brief abstract of the findings of that paper is as follows:

Beginning at sixteen weeks of age six young roosters are arranged in a hierarchy of dominance, the order being determined by the number of individuals in the group that each rooster is able to defeat in physical combat (Social Reflex No. 2). This order of ranking is revised at intervals of four weeks from the 16th to the 36th weeks. Beginning immediately after being taken from the incubator, these same individuals had been tested at frequent intervals in the Social Reflex Runway. This test consisted simply of releasing two individuals simultaneously from opposite ends of the runway, and then observing the time and distance traversed by each in running to the other (Social Reflex No. 1). Various operations from the techniques of physics were applied to these data. This was followed by the application of the simple measurements of time and space. When plotted as a function of Social Reflex No. 2, it was found that Social Reflex No. 1, when

---

<sup>1</sup>This is the second in a series of preliminary papers that will appear in *The Journal of General Psychology*, *The Journal of Genetic Psychology*, and *The Journal of Social Psychology*. The entire preliminary series is being published in this way in order to save time before a second series of more careful repetitions is begun on several new groups of chicks. This will be done in order to make certain of the incidence of these social reflexes in *Gallus domesticus* before the investigation is extended to other social animals.

<sup>2</sup>Reported in part before combined seminars at Yale, Brown, Columbia, and Clark.

plotted in terms of space alone, was almost truly linear. A theoretical correction of the abscissa units, which agreed with the empirical data, satisfied the requirements of linear function.

It was pointed out that this method of measurement and analysis was initiated as a result of reflecting on the discussion of conditions in the social sciences by Spektorsky, Sorokin, Har, and others to the effect that no genuine laws have ever been formulated in the field of social science. It was pointed out that this or some similar method, built upon the presupposition that the method operates on behavior quanta common to the social conduct of all social animals, can reach through the medium of covariable techniques to the eventual formulation of law.

### THE SUBJECTS

The subjects used in the experiments reported in this paper are the six roosters described in the first paper of this series. In order that a clear impression may be had of the individuals being dealt with, careful photographs are exhibited, Figures 1-6. In each

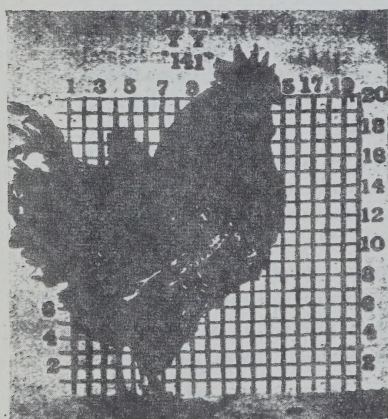


FIGURE 1

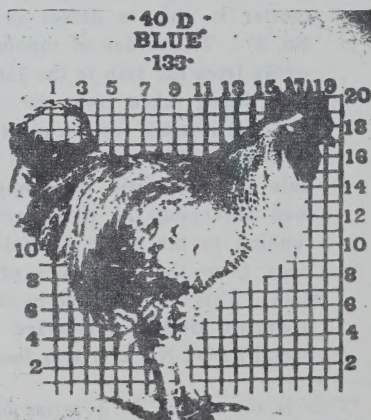


FIGURE 2

photograph the coordinates have unit dimensions in inches. The legend identifies the group, the age in weeks, the name of the individual, and his weight in ounces. The animal in each case is pressed closely against the coordinates, and the exposure is made



with a Leica camera approximately at the level of the animal's back. The pictures here exhibited are not especially good ones. Much better ones can be obtained if the negatives are exposed and developed longer, and the positives less. This blocks out all the gray background. These six figures are numbered consecutively in the order of dominance at the 36th week, the most dominant being placed first.

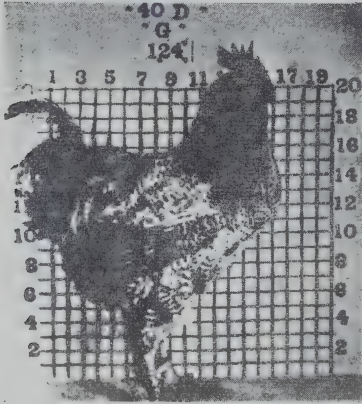


FIGURE 3

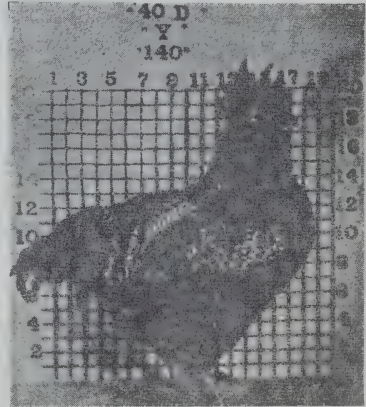


FIGURE 4

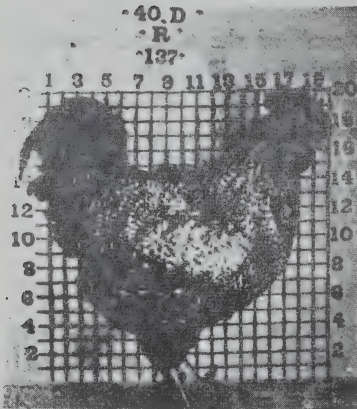


FIGURE 5

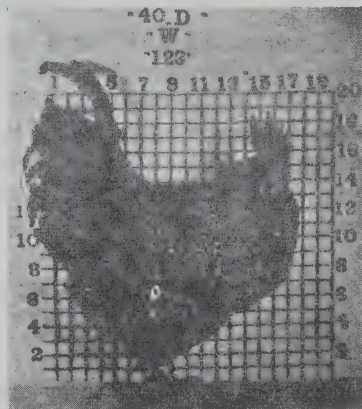
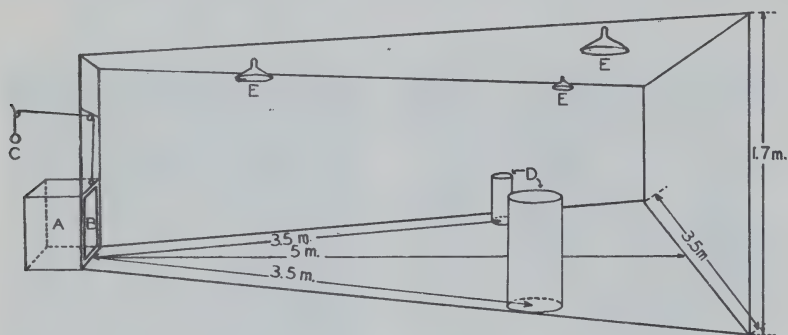


FIGURE 6

## THE APPARATUS

The Social Discrimination Cage is exhibited in Figure 7. This apparatus is built upon the floor in a warm room and is surrounded on all sides and the top with cheese-cloth. It is brilliantly illuminated on the inside, and the discrimination behavior is therefore easily observed.



SOCIAL DISCRIMINATION CAGE

A - Release Box D - Wire Mesh Cages  
 B - Release Door E - Electric Lights  
 C - Release Ring

FIGURE 7

## PROCEDURE

A pair of chicks is placed one in each of the two wire baskets inside the discrimination cage. A third chick is placed in the release box and is then released into the cage and on the median plane between the two chicks in the wire baskets. After the discrimination the pair is reversed for a second discrimination. The complete series was performed at the 20th, the 28th, and the 36th weeks.

## BEHAVIOR OF THE CHICK IN THE DISCRIMINATION CAGE

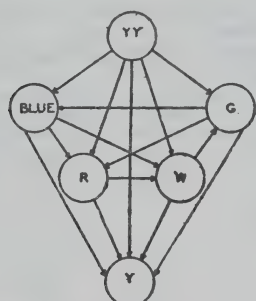
The chick emerging from the release box usually stops for a length of time which may vary from a few seconds to several minutes. He then proceeds directly or by stages to one or the other of the two chicks. When he has reached the imprisoned chick he usually



stands there until he is removed from the cage. This paper is primarily concerned with the discrimination itself, if there should prove to be a discrimination, and the relation of this discrimination to Social Reflex No. 1 and Social Reflex No. 2.

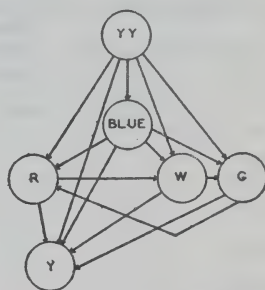
### THE RAW DATA

The raw data of Social Reflex No. 1 were published in the first paper of this series. The dominance hierarchies at intervals of four weeks and in terms of Social Reflex No. 2 are needed for frequent reference in reading this paper, and so are reproduced in Figures 8-11.



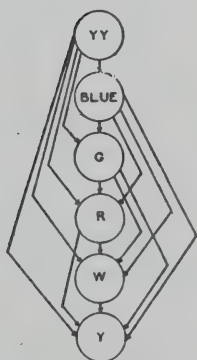
MALE "DOMINANCE" HIERARCHY,  
16TH WEEK

FIGURE 8



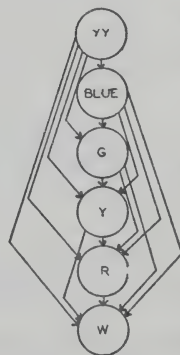
MALE "DOMINANCE" HIERARCHY  
20TH WEEK  
24TH WEEK  
28TH WEEK

FIGURE 9



MALE "DOMINANCE" HIERARCHY  
32ND WEEK

FIGURE 10



MALE "DOMINANCE" HIERARCHY  
36TH WEEK

FIGURE 11

The discrimination of roosters by roosters at the 20th, the 28th, and the 36th weeks is tabulated in Tables 1-3. It should be remembered that each pair is reversed for a second discrimination in order that direction preferences may be cancelled out. The pairings are indicated in the vertical column on the left side of each table, while the chicks that make the discriminations are indicated in the horizontal column on the top of each table. The two discriminations of each chick for each pair are tabulated in the proper space between the coordinates, and in every case the tabulation is either unanimous or split.

TABLE 1

SOCIAL DISCRIMINATION OF ROOSTERS BY ROOSTERS IN GROUP D DURING THE TWENTIETH WEEK

Each pair is reversed for a second discrimination. The pairings are in the vertical column.

	YY	Blue	White	Red	Green	Yellow
YY-Blue			+	+	+	+
Red-Green	+	+	+	+	+	+
YY-White		+		+	+	+
Blue-Yellow	+	+	+	+	+	+
White-Red	+	+	+	+	+	+
YY-Red		+	+		+	+
Blue-Green	+		+	+		+
White-Yellow	+	+		+	+	
YY-Green		+	+	+		+
Red-Yellow	+	+	+		+	
Blue-White	+			+	+	+
YY-Yellow		+	+	+	+	
White-Green	+	+		+		+
Green-Yellow	+	+		+		
Blue-Red	+		+		+	+



TABLE 2

SOCIAL DISCRIMINATION OF ROOSTERS BY ROOSTERS IN GROUP D DURING THE TWENTY-EIGHTH WEEK

Each pair is reversed for a second discrimination. The roosters are paired in the vertical column.

	YY		Blue		White		Red		Green		Yellow	
YY-Blue						+		+				
Red-Green	+	+	+	+	+	+		+	+		+	+
YY-White				+				+	+		+	+
Blue-Yellow	+	+				+		+		+		
White-Red			+	+					+	+	+	+
YY-Red				+		+			+		+	+
Blue-Green	+	+			+	+		+			+	+
White-Yellow	+	+	+	+			+	+		+		
YY-Green				+		+	+				+	+
Red-Yellow	+	+	+	+		+			+			
Blue-White	+	+					+	+		+		+
YY-Yellow				+		+		+	+			
White-Green	+		+	+			+	+			+	+
Green-Yellow	+	+	+	+		+	+					
Blue-Red		+				+			+		+	+

In Table 4 may be found the data concerning the number of times that each male chick chose the more or the less dominant of each pair in the Social Discrimination Cage during the 20th, the 28th, and the 36th weeks.

In Table 5 may be found the average time consumed by each chick at the 36th week in making a discrimination in the Social Discrimination Cage.

In Tables 6-7 may be found the discriminations of each of the five pullets in Group D for each possible pairing of the six roosters in Group D in the Social Discrimination Cage at the 16th and the

TABLE 3  
SOCIAL DISCRIMINATION OF ROOSTERS BY ROOSTERS IN GROUP D DURING THE THIRTY-SIXTH WEEK  
Each pair is reversed for a second discrimination. The roosters are paired in the vertical column.

	YY		Blue		Green		Yellow		Red		White	
YY-Blue						+		+	+	+	+	+
Red-Green	+	+	+				+	+			+	+
YY-White				+	+	+		+		+		
Blue-Yellow	+	+				+				+	+	+
White-Red	+	+	+	+	+		+	+				
YY-Red				+		+		+			+	+
Blue-Green	+	+					+	+		+		+
White-Yellow	+		+	+	+	+			+			
YY-Green				+				+		+	+	+
Red-Yellow	+		+	+	+	+					+	+
Blue-White		+				+	+	+		+		
YY-Yellow				+		+			+	+	+	+
White-Green	+	+	+				+	+				
Green-Yellow		+		+					+	+	+	+
Blue-Red	+	+			+	+		+				+

TABLE 4  
NUMBER OF TIMES THAT EACH MALE CHICK IN GROUP D CHOSE THE MORE OR THE LESS DOMINANT OF EACH PAIR IN THE SOCIAL DISCRIMINATION CAGE DURING THE 20TH, 28TH, AND 36TH WEEKS.

	YY		Blue		Green		Yellow		Red		White	
	+	-	+	-	+	-	+	-	+	-	+	-
20th Week	11	3	2	12	4	14	4	10	3	15	4	14
28th Week	6	8	3	11	5	13	2	12	4	14	1	17
36th Week	6	14	3	17	4	16	3	17	3	17	6	14
Totals	23	25	8	40	13	43	9	39	10	46	11	45
				+		-						
				74		238						
				Ratio		$\frac{1}{3.2}$						



TABLE 5

AVERAGE TIME OCCUPIED BY EACH MALE CHICK IN MAKING A DISCRIMINATION IN THE DISCRIMINATION CAGE DURING THE 36TH WEEK

	YY	Blue	Green	Yellow	Red	White
Average in seconds	27.4	81.0	73.7	122.2	72.6	95.7

TABLE 6

SOCIAL DISCRIMINATION OF ROOSTERS BY PULLETS IN GROUP D DURING THE TWENTIETH WEEK

Each pair is reversed for a second discrimination. The roosters are paired in the vertical column.

	P. Black		P.R.		P.Y.		P.G.		P.W.	
YY-Blue	+		+		+	+		+	+	+
Red-Green	+		+	+		+		+		+
YY-White		+		+	+	+	+	+	+	
Blue-Yellow	+	+	+	+	+		+		+	+
White-Red	+			+	+	+	+			+
YY-Red	+		+	+	+		+		+	
Blue-Green	+			+	+		+		+	+
White-Yellow	+		+	+	+		+		+	+
YY-Green	+		+	+	+		+		+	
Red-Yellow	+	+		+	+		+		+	+
Blue-White		+	+	+	+	+	+		+	+
YY-Yellow	+		+		+		+		+	
White-Green	+			+	+		+		+	+
Green-Yellow	+			+	+		+		+	+
Blue-Red	+			+	+	+	+	+	+	+

28th weeks. Because of the great tediousness of this test, and because it has a supporting value only for the particular measures being reported in this paper, these discriminations have not been re-

TABLE 7  
SOCIAL DISCRIMINATION OF ROOSTERS BY PULLETS IN GROUP D DURING THE  
TWENTY-EIGHTH WEEK  
Each pair is reversed for a second discrimination. The pairings are in the  
vertical column.

	P. Black		P.R.		P.Y.		P.G.		P.W.	
YY-Blue	+	+	+		+		+		+	
Red-Green	+	+	+	+		+	+	+	+	
YY-White		+	+		+	+	+	+	+	
Blue-Yellow	+		+	+	+		+	+	+	
White-Red	+		+	+	+	+	+		+	
YY-Red	+		+	+		+	+		+	
Blue-Green	+		+	+	+		+		+	
White-Yellow	+		+	+	+	+	+	+	+	
YY-Green	+	+	+		+		+		+	
Red-Yellow	+		+	+	+	+	+		+	
Blue-White	+	+	+		+		+	+	+	
YY-Yellow	+		+	+	+		+	+		
White-Green	+	+	+		+		+	+		
Green-Yellow	+	+	+			+	+	+	+	
Blue-Red	+		+		+		+		+	

peated for the 36th week. The pairings of the roosters are indicated in the vertical column on the left of each table, and the individual pullets are indicated in the horizontal column on the top of each table.

#### ANALYSES OF THE DATA

1. *Mass.* In Figure 12 the percentage of negative social discriminations of these roosters by these roosters is plotted as a function of mass at the 20th, the 28th, and the 36th weeks. If there is any relationship, it certainly is not obvious.



TABLE 8

THREE DIFFERENT RUNNINGS AT THE 40TH WEEK TO TEST THE PROBABLE ERROR OF SOCIAL REFLEX NO. 1, NOT CONSIDERING THE ERRORS OF OBSERVATION

	1st run		2nd run		3rd run	
	d	t	d	t	d	t
YY-Blue	9 + 1	2	9 + 1	6 <sup>1</sup>	9 + 1	4 <sup>3</sup>
Green-White	8 + 2	14	9 + 1	18	9 + 1	15
Yellow-Red	9 + 1	20	8 + 2	34	8 + 2	56
YY-Green	9 + 1	7	9 + 1	16 <sup>2</sup>	8 + 2	6
Blue-White	8 + 2	25	9 + 1	8 <sup>2</sup>	9 + 1	9
Green-Red	8 + 2	7 <sup>1</sup>	9 + 1	8	9 + 1	12 <sup>1</sup>
YY-Yellow	9 + 1	3	9 + 1	4	9 + 1	5
Blue-Green	9 + 1	11	8 + 2	12 <sup>1</sup>	8 + 2	29
Red-White	9 + 1	10	10 + 0	10 <sup>2</sup>	10 + 0	24
Green-Yellow	9 + 1	14	10 + 0	18	10 + 0	13 <sup>3</sup>
YY-White	9 + 1	5 <sup>2</sup>	10 + 0	3	8 + 2	10 <sup>1</sup>
Blue-Yellow	9 + 1	14	9 + 1	15 <sup>2</sup>	10 + 0	14 <sup>4</sup>
YY-Red	9 + 1	3	9 + 1	2	9 + 1	4 <sup>4</sup>
Yellow-White	8 + 2	15	8 + 2	16	8 + 2	31
Blue-Red	8 + 2	20	9 + 1	5 <sup>2</sup>	8 + 2	11

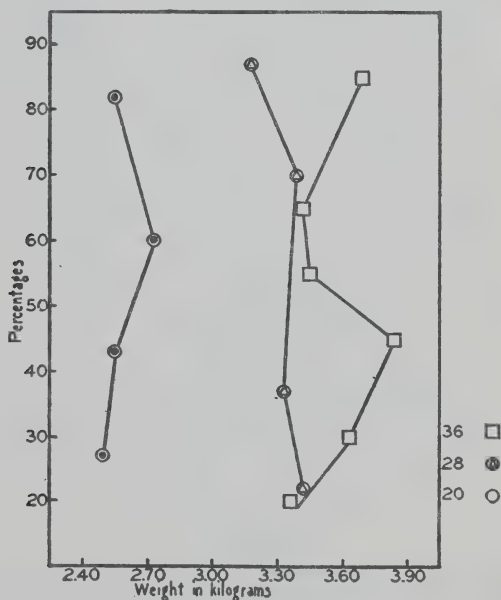


FIGURE 12

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATION PLOTTED AS A FUNCTION OF MASS DURING THE 20TH, THE 28TH, AND THE 36TH WEEKS. MALE *Gallus domesticus*, GROUP D

2. *Social Reflex No. 2*. In Figures 13-17 the percentages of discrimination are plotted as functions of Social Reflex No. 2 at the 20th, the 28th, and the 36th weeks. It will be noticed that discriminations by males are plotted in percentages of negative discrimination, and that discriminations by females are plotted in percentages of positive discrimination. This method was adopted because of the inverse relationship at these early ages of male and female discriminations of pairs of males. It is significant that the male should so frequently go to the less dominant member of a pair, while the female chooses inversely. Theoretically, there seems reason to suppose that this may be the reflex that holds the group together. Why do not the weaker members of a group separate themselves from the group and in that way escape tyranny? It seems conceivable that they may not be allowed to do so.

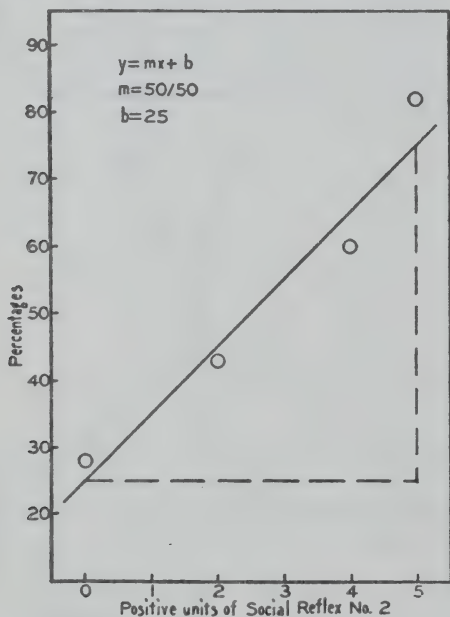


FIGURE 13

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATIONS PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 2 OF THAT INDIVIDUAL DURING THE 20TH WEEK. MALE *Gallus domesticus*, GROUP D

It is significant that the function should approach more and more to linearity, and very closely approximate linearity at the 36th week. This parallels the development of straight-line dominance, and that relationship will be discussed in a later paper.

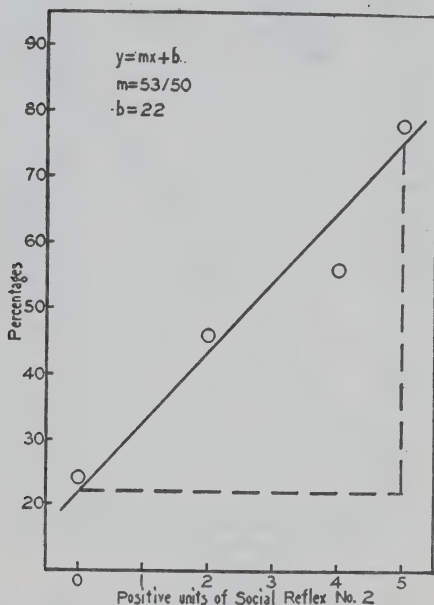


FIGURE 14

PERCENTAGES OF TIMES A MALE RECEIVES POSITIVE SOCIAL DISCRIMINATION FROM A PULLET PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 2 OF THE MALE DURING THE 20TH WEEK. MALE *Gallus domesticus*, GROUP D



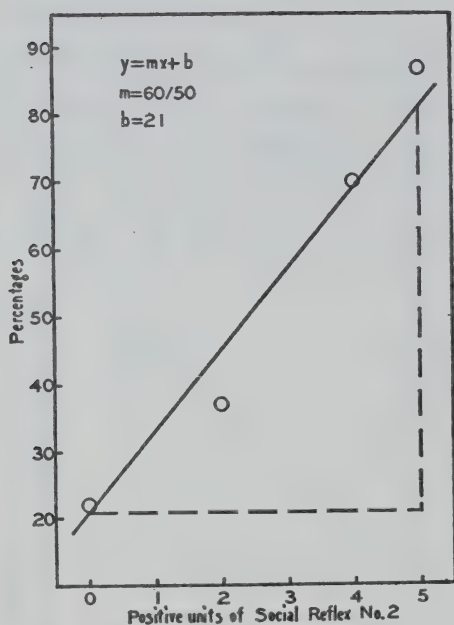


FIGURE 15

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATIONS PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 2 OF THAT INDIVIDUAL DURING THE 28TH WEEK. MALE *Gallus domesticus*, GROUP D

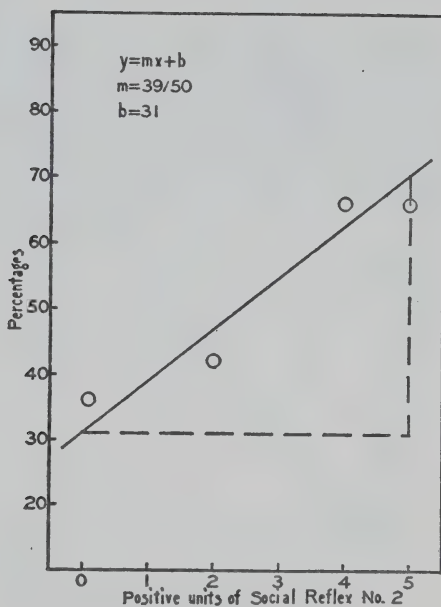


FIGURE 16

PERCENTAGES OF TIMES A MALE RECEIVES POSITIVE SOCIAL DISCRIMINATIONS FROM A PULLET PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 2 OF THE MALE DURING THE 28TH WEEK. MALE *Gallus domesticus*, GROUP D

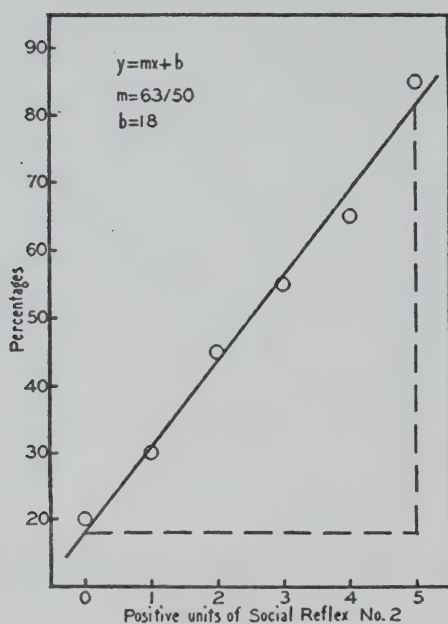


FIGURE 17

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATIONS PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 2 OF THAT INDIVIDUAL DURING THE 36TH WEEK. MALE *Gallus domesticus*, GROUP D



3. *Social Reflex No. 1.* In Figures 18-22 the percentages of discrimination are plotted as functions of Social Reflex No. 1 at the 20th, the 28th, and the 36th weeks. Here also the discriminations by males are plotted as negative discriminations, while the discriminations of males by females are plotted as percentages of positive discriminations.

It is remarkable how close to almost exact linearity the function becomes by the 36th week. One should remember that both the abscissa and the ordinate are continuous experimental series, and that no assumptions concerning the relative size of units are involved. Figure 22 is a truly beautiful exhibit, as it demonstrates that social discrimination in male *Gallus domesticus* is measurable in units that incredibly approximate the accuracy of the meter stick.

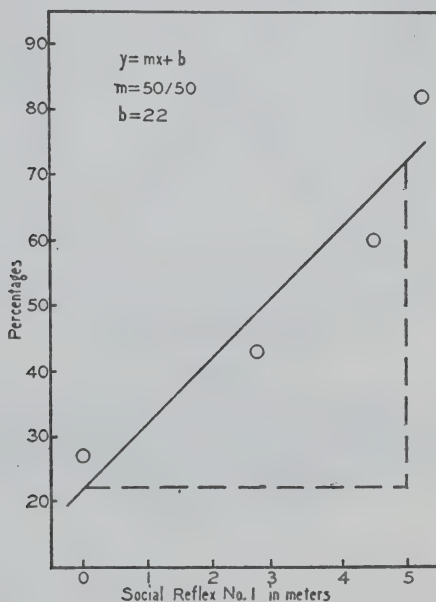


FIGURE 18

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATIONS PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 1 OF THAT INDIVIDUAL DURING THE 20TH WEEK. MALE *Gallus domesticus*, GROUP D

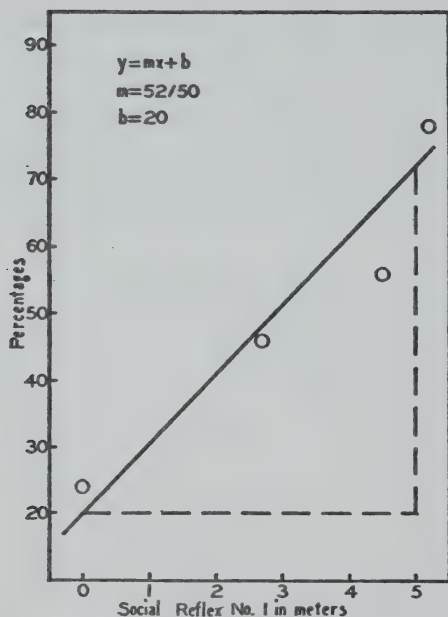


FIGURE 19

PERCENTAGES OF TIMES A MALE RECEIVES POSITIVE SOCIAL DISCRIMINA-  
 TIONS FROM A PULLET PLOTTED AS A FUNCTION OF SOCIAL REFLEX  
 NO. 1 OF THE MALE DURING THE 20TH WEEK. MALE *Gallus*  
*domesticus*, GROUP D

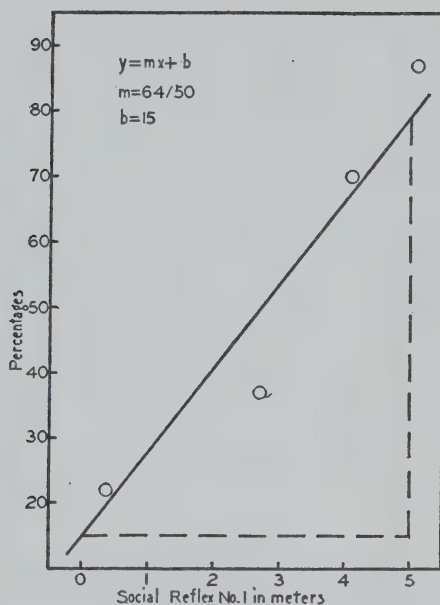


FIGURE 20

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATIONS PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 1 OF THAT INDIVIDUAL DURING THE 28TH WEEK. MALE *Gallus domesticus*, GROUP D



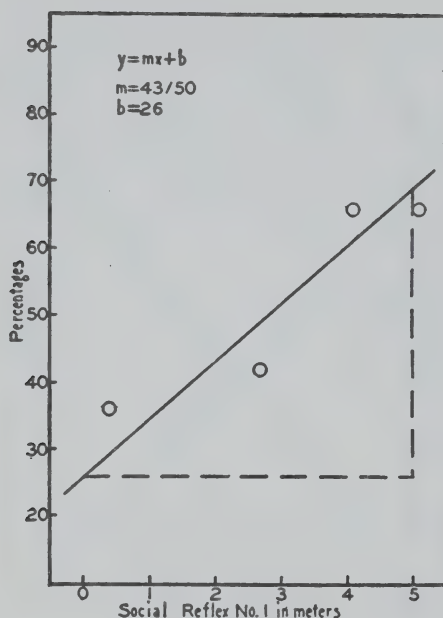


FIGURE 21

PERCENTAGES OF TIMES A MALE RECEIVES POSITIVE SOCIAL DISCRIMINATIONS FROM A PULLET PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 1 OF THE MALE DURING THE 28TH WEEK. MALE *Gallus domesticus*, GROUP D

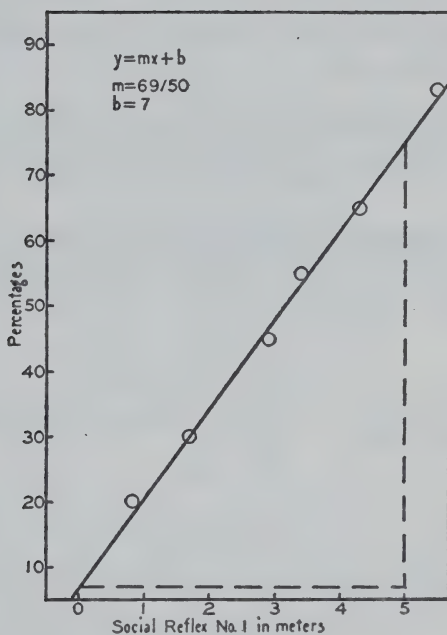


FIGURE 22

PERCENTAGES OF TIMES AN INDIVIDUAL RECEIVES NEGATIVE SOCIAL DISCRIMINATIONS PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 1 OF THAT INDIVIDUAL DURING THE 36TH WEEK. MALE *Gallus domesticus*, GROUP D

# SOME THEORETICAL PROBLEMS THAT UNDERLIE THESE METHODS OF MEASUREMENT

1. *Do errors of observation in the determination of average proportions of hierarchical totals have any relation to functional linearity?* The answer is no. The fact is elementary to any one who has any knowledge of such mechanisms. The argument follows, and for the purposes of the argument the Social Reflex Runway is reproduced in Figure 23.

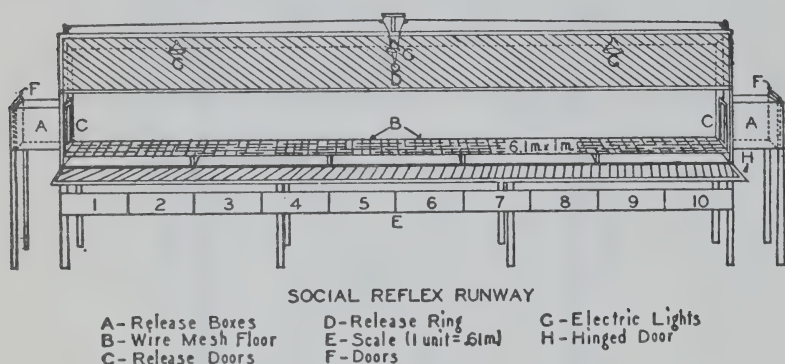


FIGURE 23

The numbers of the scale on the runway are proportions, and may be very easily transcribed into any desired units of the total distance. As two chicks come together in this runway under experimental conditions, the observer watches the space between the two shadows. As this space diminishes and vanishes, the observer determines the point on the scale where the space vanished. This point may be considered as the point where the two chicks met. Obviously this point has no relation whatever to the size of the chicks, but may vary with the observer's visual acuity. With the runway divided into ten units, the only doubt in the observer's own mind concerning a reading would be in the determination of the exact place within a unit where the shadows met. Such doubts are arbitrarily eliminated when the plan of the experiment calls for ten units only, and not for a hundred or a thousand. If a moving picture camera were being used to locate the subjects against a coordinated floor, exact measurements could be made on the negatives.



In exploratory experiments of this type such a procedure would be stupid, though it may be very valuable later. If the two subjects meet anywhere in the seventh unit, the reading is  $7 + 3$ . If they meet in the eighth unit, the reading is  $8 + 2$ . If they meet in the ninth unit, the reading is  $9 + 1$ . If they meet in the tenth unit, the reading is  $10 + 0$ . At the line of division between any two units, the observer must place the meeting point in one unit or the other. This very seldom happens. Of course it may actually happen more often than the observer believes. All such errors, however, must be classified as errors of observation and are not to be confused with errors that are intrinsic in the size of unit used. The question now is, do these errors of observation influence the functional linearity of the series being measured?

If each chick of the six at the 36th week were to run the total distance in the Social Reflex Runway against each other chick he is able to defeat in a fight, the total relative distances each chick would run during the five occasions would be

50    40    30    20    10    0

and the ratios of their averages would be

$\frac{10}{10}$      $\frac{8}{10}$      $\frac{6}{10}$      $\frac{4}{10}$      $\frac{2}{10}$      $\frac{0}{10}$  .

If each chick runs 9 of the total distance against each chick he

10

is able to defeat, the relative total distances would be

45    37    29    21    13    5

and the ratios of their averages would be

$\frac{9}{10}$      $\frac{7.4}{10}$      $\frac{5.8}{10}$      $\frac{4.4}{10}$      $\frac{2.6}{10}$      $\frac{1}{10}$  .

If each chick runs 8 of the total distance against each chick he

10

is able to defeat, the relative total distances would be

40    34    28    22    16    10

and the ratios of their averages would be

$\frac{8}{10}$      $\frac{6.8}{10}$      $\frac{5.6}{10}$      $\frac{4.4}{10}$      $\frac{3.2}{10}$      $\frac{2}{10}$  .

If each chick runs 7 of the total distance against each chick he

10

is able to defeat, the relative total distances would be

35    31    27    23    19    15

and the ratios of their averages would be

$\frac{7}{10}$      $\frac{6.2}{10}$      $\frac{5.4}{10}$      $\frac{4.6}{10}$      $\frac{3.8}{10}$      $\frac{3}{10}$

It should be clear from the above that errors, if extreme and in a constant direction, would merely change from one series of ratios to another. If the errors are extreme and equally divided in direction, a median series of ratios is set up. If the errors are less than extreme and divided in direction, there will be a series of

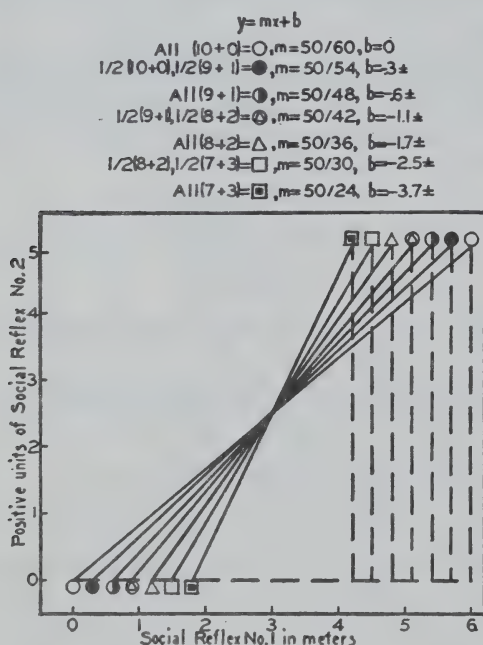


FIGURE 24

A THEORETICAL FAMILY OF CURVES, THE PURPORT OF WHICH IS TO INDICATE THAT ERRORS OF OBSERVATION UNDER THE CONDITIONS OF HIERARCHICAL TOTALS HAVE NO RELATION TO LINEARITY. IT IS ONLY AS A MATTER OF CONVENIENCE THAT THE NOMENCLATURE OF AN EMPIRICAL SITUATION IS USED. THE PRINCIPLE APPLIES TO ANY ORDER OF MEASUREMENTS, WHETHER EMPIRICAL OR THEORETICAL

ratios set up that will lie between the two series that are functions of extreme errors, and the proportional distance from these two series will vary directly with the variation of the errors from the extreme and the variation of direction from constancy. This whole argument is presented in graphic form in Figure 24. The conclusion is that errors of observation under the special conditions of determining proportional averages of hierarchical totals have no relation to functional linearity, but do influence slopes. It has not yet been determined or assumed that slopes have any significance in this type of measurement, except that it is a matter of direct logical inference that the slope must vary with the size of the hierarchy.

2. *Is there a "probable error" in the behavior of the chick itself that might disturb functional linearity?* During the first eight weeks of testing Social Reflex No. 1, the daily averages did fluctuate. No hierarchy had yet been established by the chicks, however, and there was no theoretical reason why fluctuation should not take place. Radical fluctuations had almost ceased by the 16th week. After the 28th week not a single reversal of this reflex has been observed except when there has been a reversal of dominance. When a pair is reversed in dominance, it is reversed in all these other respects also. Now that straight-line dominance has been established, practically all readings in the Social Runway are  $8 + 2$ ,  $9 + 1$ , and  $10 + 0$ . Very rarely is there a reading that is as near equality as  $7 + 3$ . No reading as low as  $6 + 4$  has occurred for many months, and yet such a reading would still be significant.

As a special test all pairings of males were tested for Social Reflex No. 1 on three separate occasions at least one day apart at the 40th week. The raw data of these three tests are exhibited in Table 8. The graphical representation is exhibited in Figure 25. On the basis of the graphical measurements the P.E. is  $.16 \pm$  meters, which is absorbed in the errors of observation. It follows that the P.E. of the reflex itself does not seriously influence linearity. As a matter of interest, it might be noticed that the relationship of the second and the third experimental points on the functional line indicates that a struggle for dominance between these two birds is still unsettled or is brewing.

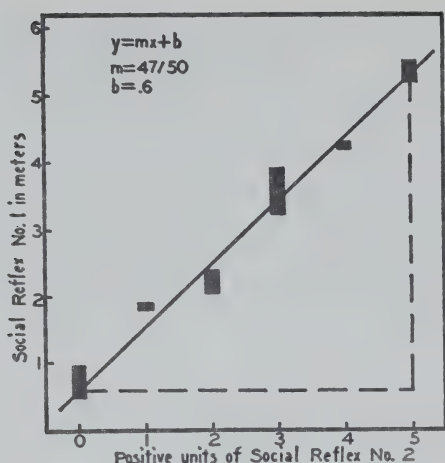


FIGURE 25

SOCIAL REFLEX NO. 1 PLOTTED AS A FUNCTION OF SOCIAL REFLEX NO. 2 AT THE 40TH WEEK, MALE *Gallus Domesticus*. OBVIOUSLY THERE WERE FIFTEEN PAIRINGS, BUT THESE PAIRINGS WERE RUN ON THREE OCCASIONS SEPARATED BY AT LEAST ONE DAY. EACH POINT REPRESENTS VERTICALLY THE TOTAL RANGE OF THE THREE AVERAGES AND IS DETERMINED BY FIFTEEN SEPARATE READINGS. THE P.E. IS  $.16 \pm$  METERS, AND IS ABSORBED IN THE ERRORS OF OBSERVATION WHICH DO NOT INFLUENCE LINEARITY

### GENERAL SUMMARY

Social discrimination in *Gallus domesticus* is identified as it is measured in the Social Discrimination Cage. When the discriminations are plotted against mass, there is no indication that the discriminations are any more than chance. When the discriminations are plotted against Social Reflex No. 2, a relationship appears which approaches a linear form. When the discriminations are plotted against Social Reflex No. 1, true linearity is approximated at the 36th week. The analyses show that male discriminations for pairs of males are away from dominance, and that female discriminations for pairs of males are in the direction of dominance. The constancy of this trait in males makes it possible to measure social discrimination with great accuracy. Since the negative response to the more dominant of a pair approximates a true linear relationship with



Social Reflex No. 1, it becomes possible to measure social discrimination in *Gallus domesticus* in units of space. It is pointed out that the P.E. of the chick's own reflex and the errors of observation on the part of the experimenter have very little if any influence on the linearity of these functions.

### REFERENCE

1. MURCHISON, C. The experimental measurement of a social hierarchy in *Gallus domesticus*: I. The direct identification and direct measurement of Social Reflex No. 1 and Social Reflex No. 2. *J. Gen. Psychol.*, 1935, 12, 3-39.

Clark University  
Worcester, Massachusetts

### LA MESURE EXPÉRIMENTALE D'UNE HIÉRARCHIE SOCIALE CHEZ *GALLUS DOMESTICUS*: II. L'IDENTIFICATION ET LA MESURE INFERENTIELLE DU REFLEXE SOCIAL NO. 1 ET DU RÉFLEXE SOCIAL NO. 2 AU MOYEN DE LA DIS- CRIMINATION SOCIALE

(Résumé)

La discrimination sociale chez *Gallus domesticus* est identifiée comme elle est mesurée dans la Cage de Discrimination Social. Quand les discriminations sont dessinées contre la masse, il n'y a aucune indication que les discriminations sont plus que le hasard. Quand les discriminations sont dessinées contre le Réflexe Social No. 2, une relation paraît qui s'approche d'une forme linéaire. Quand les discriminations sont dessinées contre le Réflexe Social No. 1, le vrai caractère linéaire est approximé à la 36<sup>me</sup> semaine. Les analyses montrent que les discriminations mâles pour les paires de mâles sont dans une direction éloignée de la dominance, et que les discriminations femelles pour les paires de mâles sont dans la direction de la dominance. La constance de ce trait chez les mâles le rend possible de mesurer la discrimination sociale avec une grande exactitude. Puisque la réponse négative au plus dominant d'une paire approxime une vraie relation linéaire avec le Réflexe Social No. 1, il devient possible de mesurer la discrimination sociale chez *Gallus domesticus* en unités de l'espace. On indique que le P. E. du propre réflexe du poussin et les erreurs d'observation par l'expérimentateur ont très peu ou nulle influence sur le caractère linéaire de ces fonctions.

MURCHISON

**DIE EXPERIMENTELLE MESSUNG EINER SOZIALEN HIERARCHIE  
BEI *GALLUS DOMESTICUS*: II. DIE IDENTIFIZIERUNG UND  
FOLGERUNGSMESSUNG DES SOZIALEN REFLEXES NR. 1  
UND DES SOZIALEN REFLEXES NR. 2 VERMITTELST  
DER SOZIALEN UNTERSCHIEDUNG**

(Referat)

Die soziale Unterscheidung bei *Gallus domesticus* wird bei deren Messung in dem sozialen Unterscheidungskäfig festgestellt. Wenn die Unterscheidungen graphisch gegen Mass dargestellt werden, gibt es keine Andeutung, dass die Unterscheidungen mehr sind als Zufall. Werden die Unterscheidungen graphisch gegen den sozialen Reflex Nr. 2 dargestellt, so erscheint ein Verhältnis, das sich einer Linearform nähert. Wenn die Unterscheidungen graphisch gegen den sozialen Reflex Nr. 1 dargestellt werden, so nähern sie sich der wahren Linienförmigkeit bei der 36. Woche. Die Analysen zeigen, dass männliche Unterscheidungen für Paare der Männchen sich in der Richtung vom Herrschen entfernen, und dass weibliche Unterscheidungen für Paare der Männchen in der Richtung des Herrschens gehen. Die Beständigkeit dieses Charakterzuges bei Männchen ermöglicht die Messung der sozialen Unterscheidung mit grosser Genauigkeit. Da die negativ Antwort auf das herrschendere eines Paares sich einem wahren Lineaverhältnis bei dem sozialen Reflex Nr. nähert, wird es möglich, die soziale Unterscheidung bei *Gallus domesticus* in Raumeinheiten zu messen. Es wird darauf hingewiesen, dass der wahrscheinliche Fehler des eignen Reflexes des Kückens und die Beobachtungsirrtümer seitens des Versuchsleiters sehr wenig Einfluss, wenn überhaupt einen, auf die linienförmigkeit dieser Funktionen haben.

MURCHISON

# JUDGMENT OF FACIAL EXPRESSION OF EMOTION IN THE CHIMPANZEE\*

*From the Laboratory of Comparative Psychology, Columbia University*

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JOHN P. FOLEY, JR.

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Emotional reactions occur in the widest variety of animal forms, but nowhere do they appear in such complex and subtle forms as in man and the infrahuman primates. Not only are these emotional reactions themselves of importance in the animal world, but the appropriate response to facial and other overt emotional expression is and has been of extreme evolutionary significance in terms of survival value. In contemporary human society, the importance of the ability to recognize facial expression of emotion is well affirmed by both applied and social psychology. In fact many detailed and highly specialized techniques have been recently developed for studying this ability and the manner and sequence of its development.

The two major problems confronting the investigator in this field are: (1) the facial or other emotional expression itself, and (2) the judgment of such an expression. The experimental data of the present investigation are particularly relevant to the second problem, although certain basic facts pertaining to the first question must needs be included in the discussion. It should also be pointed out that nearly all of the prolific experimental work in this field has dealt with *human judgment of human expression*. Rarely has the comparative approach, outlined by Darwin and others, been applied. As in many other psychological problems, the deafening din of the cry for human data of "practical use" has masked the study of the phenomena in various animal forms, thereby making the conclusions of both limited application and slight basic import.

The studies and publications in the field of facial and overt bodily expression of emotions and related topics are so voluminous that it is useless to try to summarize completely the findings within this brief article. Jenness (75) has recently published an excellent survey of much of this literature, and the reader is referred to that article for a more exhaustive treatment of many topics. Only the historically

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\*Accepted for publication by Carl J. Warden of the Editorial Board.

important, representative, and relevant studies will be mentioned here, the primary motive being to cover a wide range of material as briefly as possible, although the bibliography has been made more nearly complete and up-to-date.

The earliest attempts to describe and judge the facial expression of emotions were those of the physiognomist, who purported to be able to discover emotional and other mental characteristics from the outward appearance of the face. In 1667, Le Brun (100), a French painter, published his famous *Conférences* on the expression of emotion. The *Discours* by the Dutch anatomist, Camper (16, 17), delivered 1774-1782, represents the best achievement of the following century. The difficulty encountered by early workers is perhaps best exemplified by the statement of the eminent physiologist, J. Müller (cf. Ribot, 128), who declared that the expression of emotions is completely inexplicable.

It was not until 1806, however, with the publication of the first edition of Sir Charles Bell's *Anatomy and Philosophy of Expression* (5), that the study of facial expression assumed a more objective and scientific status. Bell's excellent work was supplemented by the work of Henle (60), who tried more systematically to describe the facial musculature during emotional reactions. Contemporary with the work of Bell and Henle was that of J. C. Lavater (99), Burgess (14), Moreau (cf. 100), and many others.

In 1862 Duchenne (28), of Boulogne, attempted to analyze facial expression electrically. He galvanized certain facial muscles of an old man whose skin was hyposensitive or anaesthetic, and thus produced various facial expressions which were photographed and reproduced in magnification. From a study and analysis of the movements of the facial muscles, Duchenne ascribed a specific expressive function to each muscle, the isolated contraction of which produced definite furrows on the skin. Not only did he hold that the contraction of a single muscle often sufficed to express a "passion," but he also concluded that every emotion has its own specific, precise, and unique local modification. Thus the frontal was for him the muscle of attention; the upper orbicular of the lips the muscle of reflection; the pyramidal (inter-superciliary) expressed threats; the great zygomatic, laughter; the lesser zygomatic, weeping; and the triangular muscle of the lips, disdain. It is interesting to note,



especially in contrast to the later view of Darwin, that Duchenne considered these emotional gestures to be divinely instituted. Ribot (128) quotes the following curious passage from Duchenne:

The Creator, not being obliged to study mechanical requirements, was able, according to His wisdom or (if I may be pardoned for using this form of expression) by a Divine fantasy, to put in action this or that muscle—a single one, or several at once, when it was His will that the signs of the passions, even the most evanescent, should be temporarily inscribed on the human countenance. This physiognomic language once created, it was sufficient, in order to render it universal and immutable, to give to every human being the instinctive faculty of always expressing his feelings by the contraction of the same muscles.

The ensuing work of Dumas (29, 30, 31), however, refuted such a specificity theory.

The second half of the nineteenth century witnessed frequent attempted generalizations regarding the emotional patterns of expression, as is testified by the work of Bain (4), Spencer (136), Nony (117), and Mosso (115), the last named contending, for example, that the *quantity* of stimulation, rather than the quality, determined the expression. Thus Mosso purported to show that if increasing increments of electric current were applied to the facial nerve of an anaesthetized dog, the expression gradually changed from mimicry of attention to that of anger, etc. Similarly, Dumas (29, 30, 31) has argued for a synergic muscular response characteristic of certain emotional states. He showed that faradic stimulation of the cheek produced a smile, similar to that found in hemiplegia, being the hypertonic contraction of a localized muscle group, whereas a more intense faradic stimulation caused a grimace, or more generalized and extreme muscular contraction.

In 1865, the French anatomist, Gratiolet (54) attempted to develop a "sympathetic" or "symbolic" theory of facial expression. The later mimetic theory of Wundt (150, 151) was largely accepted by Ribot (128) and others. Piderit (121), as early as 1859, studied what may be termed the "geometry" of expression, making use of a plaster head, the parts of which might be experimentally interchanged to produce a wide variety of facial expressions. Piderit's diagrams have been subsequently modified and used by

Boring and Titchener (8), Frappa (44), Guilford (57), Hughes (65), and T. V. Moore (112).

All of the earlier workers, with the exception of Spencer (136), regarded each species of animal as distinct from all the rest, and thus made no attempt to study the *evolution* of facial expression. In fact Bell (5) maintained that many of the facial muscles were "purely instrumental in expression," this view being subsequently overthrown by Darwin (24), who held that "distinct uses, independently of expression, can indeed be assigned with much probability for almost all the facial muscles." In accordance with the trend of the times, Bell (5), postulating a sharp dichotomy between man and the lower animals, asserted that "with the lower creatures there is no expression but what may be referred, more or less plainly, to their acts of volition or necessary instincts." He further maintained that their faces "seem chiefly capable of expressing rage and fear." To this Darwin (24) answered that "man himself cannot express love and humility by external signs, so plainly as does a dog."

Among the more important early work on the facial musculature of expression in anthropoids was that of Owen (119), who in 1830 showed that the orang and other anthropoids possess the same facial muscles as man. Similarly, in 1871, Macalister (107) described the facial muscles of the chimpanzee. These excellent treatises, although not as complete in detail as the recent work of Huber (63, 64), served as morphological evidence against the man-beast dichotomy mentioned above, and gave experimental support to the evolutionary or comparative view of facial expression which culminated in the Darwinian theory.

The epoch making work of Darwin (24) first published in 1873, marked the first objective attempt to answer the question as to why and how a given emotion is correlated with a given facial expression. The three major contributions made by Darwin were: (1) the evolutionary approach, exemplified by the comparative study of emotional reactions in many species; (2) detailed descriptions of each of the various emotions; and (3) the exposition of so-called general laws of expression, as reduced to the three principles of (*a*) serviceable associated habits, (*b*) antithesis, and (*c*) direct action of the nervous system. These principles have been recently criticized and reinterpreted by Craig (21) and Allport (2). Crile (22, 23) has

followed Darwin in his phylogenetic approach. The following quotation from Darwin (24, p. 12) illustrates the point of view:

No doubt as long as man and all other animals are viewed as independent creations, an effectual stop is put to our natural desire to investigate as far as possible the causes of Expression. By this doctrine, anything and everything can be equally well explained; and it has proved as pernicious with respect to Expression as to every other branch of natural history. With mankind some expressions, such as the bristling of the hair under the influence of extreme terror, or the uncovering of the teeth under that of furious rage, can hardly be understood, except on the belief that man once existed in a much lower and animal-like condition. The community of certain expressions in distinct though allied species, as in the movements of the same facial muscles during laughter by man and by various monkeys, is rendered somewhat more intelligible, if we believe in their descent from a common progenitor. He who admits on general grounds that the structure and habits of all animals have been gradually evolved, will look at the whole subject of expression in a new and interesting light.

Among the difficulties associated with the observation of expression, Darwin (24) mentions the following: the fleeting nature of some expressions, the often minute and slightly discernible changes in the features, distraction of attention and arousal of sympathy at the sight of strong emotions, anticipation of what to expect and other deceptions of the imagination, and personal bias from long familiarity with the subject. Darwin further maintained that several procedures should be followed "in order to acquire as good a foundation as possible and to ascertain, independently of common opinion, how far particular movements of the features and gestures are really expressive of certain states of the mind." Among such methods, he listed: (1) observation of infants; (2) observation of the insane; (3) observation of photographs, models, and electrically activated facial muscles; (4) observation of painting, sculpture, and other works of art; (5) observation of the different races of man; and (6) observation of emotional expression in animals. Darwin held that the one way to test a conclusion was to determine "whether the same general principles can be applied with satisfactory results, both to man and the lower animals."

Many investigators have utilized sketches, drawings, or photo-

graphs demonstrating facial expression of emotions. Rudolph (131) presents perhaps the most complete repertory, his atlas containing 680 sketches of facial configurations, modified from poses by a German actor. Feleky (37, 38) utilized several hundred photographs of herself, each portraying a deliberate attempt to represent a certain emotion. The Ruckmick photographs (129, 130) represent similar poses of an experienced amateur actress, whereas Kline (80) utilized two series of photographs similar to those of Ruckmick. Frois-Wittman (45) presents 50 photographs of herself with corresponding sketches showing the various involvements and configurations of the facial musculature. Mention has been made above of the various modifications and utilizations of the Piderit diagrams (121). Von Oertzen (118), Kohts (84, 85, 86), and Yerkes (152, 153) have published a number of photographs of emotional expression in monkeys and apes, particularly the chimpanzee, and the latter two investigators, together with Köhler (82, 83) and others, have attempted systematically to describe primate behavioral patterns in various emotional situations. Yerkes and Learned (154) have recorded and studied the vocal expressions of the chimpanzee under different stimulating conditions.

The following studies are among the most important of those containing original photographs or drawings illustrating facial reactions to emotional stimulation: Allport (2), Bell (5), Crile (22,23), Darwin (24), Duchenne (28), Dumas (29), Feleky (37, 38), Frois-Wittman (45), Hughes (65), Kline (80), Kohts (84, 85, 86), Landis (94), T. V. Moore (112), Moss (113, 114), Mosso (115), von Oertzen (118), Piderit (121), Ruckmick (129), Rudolph (131), Schultze (132), Watson (147), Wundt (151), and Yerkes (152, 153). In addition to the above-mentioned works dealing with the facial expression of emotion itself, there are many interesting studies of relevant subproblems, of which only a few of the more important can be mentioned here. For a more detailed discussion, the reader is referred to the survey by Jenness (75), whose general classification of problems is followed below. For secondary treatments of various problems relating to the facial expression of emotions, the reader is referred to the works of Allport (2), Jones (76), Lachr (88), Murphy and Murphy (116), Washburn (141), and many textbooks in general psychology.



In regard to the problem of *innate vs. acquired patterns of facial expression*, Landis (94), on the basis of experimental data, has even questioned the very existence of such patterns. He maintains (92) that the photographs and drawings used in such studies are not "true portraits of the facies of emotion but are rather pictures of the socialized and to a large extent conventionalized reactions which are used as supplementary language mechanisms." In a later discussion, Landis (91) suggests that there are probably certain innate expressions of emotion, but that their recognition is acquired.

The problem of *facial patterns in infants*, suggested by Darwin (24), has been frequently investigated. Mention should be made of the work of Blanton (7), C. Bühler (12, 13), Cooley (20), Gesell (51, 52), M. C. Jones (77), K. C. Moore (111), Perez (120), Preyer (126, 127), Sherman (133, 134), R. W. Washburn (142), and Watson (143, 144, 145, 146, 147).

Most experiments, however, involve not only the factor of facial patterns themselves, whether innate or acquired, but the additional problem of the *recognition or judgment of such overt expressions* by observers. Most of the earlier workers, such as Bain (4) Darwin (24), and Lemoine (101), regarded the ability as innate, and this view is still held by many modern mentalists. Cooley (20), Landis (91), and others, however, have cited experimental evidence favoring the opposite view. In fact, the voluminous data now at hand argue convincingly against any such innate ability. Bühler (12, 13), Dashiell (25), Figurin (42), Gates (48, 49), Hetzer and Tudor-Hart (61), and Kellogg and Eagleson (79) have found levels of recognition, the responses to certain facial patterns being acquired during definite stages of the developmental cycle. Gates (48, 49) found that the ability to interpret facial expression increases with the chronological age of the child, even when intelligence is held constant, and these results have been confirmed by other investigators.

A closely related problem is that of the *effect of training on the recognition of emotional expression*. Allport (2), Guilford (56), and Jenness (74) have studied this problem. Guilford concludes, for example, that while there may be general intrinsic differences in sensitivity and in the ability to learn facial expressions, the wide individual differences in this respect are due to differences in training and practice in reacting to the expressive criteria.

Historically, the question as to the *effect of suggesting names on the judgment of emotional expression* has been both interesting and enlightening. In fact such suggestion factors influenced the results of some of the earlier investigators, until their presence was recognized. Langfeld (96), Jarden and Fernberger (71), and Fernberger (40, 41) have dealt with this problem. Having found suggestion to have influenced the judgment of expressions to such a marked extent, Fernberger (40) concluded that "the perception of emotional states in others by their expression is of the nature of social meanings and that they are much more dependent on the stimulus-attention than on anything characteristically intrinsic in the facial expression or reaction."

Much attention has been given to the problem of the *prevalence and range of ability to recognize facial expressions*, and each of the following investigators has reported a *low average incidence* of such an ability, with *wide individual differences*: Allport (2), Boring and Titchener (8), Buzby (15), Darwin (24), Duchenne (27), Fernberger (39, 40, 41), Goodenough (53), Guilford (56), Jarden and Fernberger (71), Jenness (72, 73), Kanner (78), Kellogg and Eagleson (79), Langfeld (95), Schultze (132), Sherman (133), and Stratton (137). Thus the experimental data refute the popular notion that human beings are able to recognize and identify emotional expressions in the faces of other humans, Landis (92) concluding, for example, that the results were approximately what might have been expected by chance alone. It might also be mentioned in this connection that Anderson (1), Gaskill, Fenton and Porter (47), Hollingworth (62), Laird and Remmers (90), and Pintner (123) have conclusively shown that subjects are similarly unable to make accurate estimates of intelligence from printed photographs, although Uhrbrock (139) found that such judgments can be correctly made under certain prescribed conditions.

The problem of *sex differences in the ability to recognize facial expressions* has yielded conflicting results. The data of Allport (2), Fernberger (40, 71), Gates (48), and Guilford (56) showed no pronounced sex differences. Buzby (15), Jenness (73), and Kellogg and Eagleson (79), on the other hand, found the means and medians for the women to be slightly higher than those for the men, whereas Kanner (78) found the men to be superior. Jenness (75) concludes

that "the net results of experiments seem to indicate that women slightly excel men as judges of facial expression of emotion." Such a sex difference is undoubtedly very small, and is probably culturally determined.

The question of the *relationship between ability to judge facial expression and so-called general intelligence* has also been investigated. Consistently low but positive correlations have been reported by Gates (48), Jenness (72), Kanner (78), and Kellogg and Eagleson (79). A related problem deals with the *relationship between the ability to judge facial expression and "social intelligence."* In the original construction of the George Washington University Social Intelligence Test, Moss and his colleagues (67, 113, 114) assumed that the ability to estimate facial expression from photographs was an integral part of "social intelligence." Lersch (102) and Nony (117) have further emphasized the social importance of such an ability.

A very interesting and important problem is that of the *relative identifiability of various facial expressions*. The major results of representative studies are reported below, the emotions being listed in decreasing order of the frequency of correct identification:

Allport (2): laughter, bodily pain, fear (horror), distrust (hate), amazement, anger, doubt, disgust.

Gates (48), children: laughter, pain, anger, fear, surprise, scorn; adults: laughter, scorn, fear, anger, pain, surprise.

Jenness (73): amazement, laughter, bodily pain, anger, distrust, disgust (scorn), fear (horror), doubt (misgiving).

Kanner (78): surprise, fear, breathless interest, contempt, horror, determination, disgust, sneer, hate, despair, pain, shame, rage, sympathy, suspicion, pity, interest, justified anger. (Laughter or smiling not used.)

Langfeld (95): laughter, amazement, bodily pain, hate (aversion), fear, disgust, doubt, anger.

Ruckmick (129): primary emotions (love, hate, joy, sorrow) better than secondary (repulsiveness, surprise, distrust, defiance).

Buzby (15), and Jarden and Fernberger (71), using Boring and Titchener model: positive for horrified, disdainful, disgusted, and bewildered faces; negative for angry and dismayed faces.

It should be pointed out that various factors, such as the use of widely different photographs and experimental procedures, make valid

analytic comparison impossible. Jenness (75) concludes that "it is significant, however, that laughter stands out above the other expressions as the most readily identified pattern. Further generalization will have to await the development of better and more uniform experimental techniques than those available at present."

Analysis of a given emotional expression at once presents the problem as to *which features contribute most to facial patterns of expression*. Buzby (15) reported that the upper part of the face was the more important for correct identification, although the bulk of experimental evidence is in favor of the priority of the lower half of the face, as testified by the work of Boring and Titchener (8), Dunlap (34), Ruckmick (129, 130), and Wundt (151). Wundt held that the mouth was the most important element; and Dunlap, having his subjects fit the lower half of one photograph to the upper half of another, likewise maintained that the mouth was more important than the eyes. Frois-Wittman (45), however, found no such indication of the primary importance of the mouth, and advanced the more or less "gestalt" view that the significance of a particular muscular involvement is not constant, but relative to the rest of the pattern. Mention might also be made of the study by Irwin (68), who attempted "to investigate the relationship between the thresholds for the perception of differences in facial expression and those for the perception of differences in certain elements of the expression," using a series of diagrammatic faces. Five subjects, however, gave no consistent results. In a recent study in which the subjects judged 35 photographs of manual expression, posed by an experienced actor and photographed so as to show only hands and wrists, Roberts and Carmichael (157) found "a common ability of judgment in some ways as satisfactory as the commonality found in judgments of facial expression."

Lastly, let us consider briefly the problem of *methods used in the identification of facial expression*. Following are a number of typical results, illustrating the wide variety of methods employed by different observers:

Allport (2): average ability of subjects increased after short period of training with table of synopsis of facial expressions; gain through training was inversely proportional to original ability.



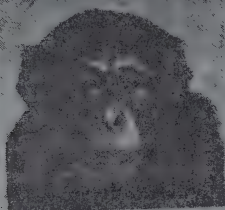
- Feleky (38): assumption of judges of the mental and bodily attitudes portrayed in photographs.
- Guilford (56): by experimentally controlling the judgment time, i.e., long or short, the experimenter could favor the "analytical" or the "unanalytical" judges.
- Langfeld (95): mostly sympathetically imitated the expressions portrayed in pictures, i.e., sympathetic responses.
- Ruckmick (129, 130): visualizing gestures and postures of the body accompanying pictures of the face; imagining events or stimuli which might have brought on the expression; hearing words spoken; recalling analogous situations from their own experience; analyzing the experience impersonally and objectively.
- Sherman (133, 134), Fernberger (40), Landis (92): persons tend to identify expressions from knowledge of the stimuli preceding them, or of the situations in which the responses occur, rather than on the basis of the facial patterns themselves.
- Woodworth (149): the relation of situation and response is the essential feature of the judgment and identification of emotions.

#### PROBLEM, MATERIALS, AND PROCEDURE

The object of the present study was to investigate the human judgment of photographs of the facial expression of emotion in the chimpanzee. The photographs employed were used by special permission of Mrs. Ladigin-Kohts, of the Laboratory for Zoopsychology, Museum Darwinianum, Moscow, U. S. S. R. These photographs, reproduced in the accompanying plate, represent six facial expressions of Ioni, a five-year-old male chimpanzee, the emotions represented being those of (1) quietude, (2) sadness, (3) laughter, (4) weeping, (5) anger, and (6) excitement, respectively. These photographs are, to the writer's knowledge, the best ones available for such a study, since they represent excellent illustrations of the same subject in a wide and representative variety of emotional reactions. For additional pictures of emotional reactions in the chimpanzee, the reader is referred to Kohts (84, 86), Yerkes (152, 153), and von Oertzen (118).

The question naturally arises as to the stimulus conditions under which each of the photographs was taken, i.e., as to the validity and





QUIETUDE  
Figure 1



SADNESS  
Figure 2



JOY  
Figure 3



WEEPING  
Figure 4



ANGER  
Figure 5



EXCITEMENT  
Figure 6

adequacy of the various names associated by Kohts with the respective pictures. In a personal communication to the writer, Mrs. Kohts makes the following statements, which are reproduced in full:

Figure 1. The expression of *quiet* features the usual condition of the chimpanzee when he is inactive, undisturbed and remains in his usual environment.

Figure 2. *Depression* or *sadness*. Slight protrusion of tightly compressed lips, lifting of eyes. Observable when the ape is slightly depressed or saddened and principally takes place when there is some slight delay in supplying his wants, such as in giving him food, drink, or sleeping accommodations. Also frequently noticeable upon refusal to comply with some of the chimpanzee's desires, such as taking him into one's arms, letting him have some desired object, preventing his escape from the cage; also to be seen when experimenter or guardian (to whom he feels particular affection) gives signs of withdrawing. Such signs of depression are usually accompanied by extending of arms and soft whimpering.

In case the chimpanzee sees that his desires fail definitely to be granted and especially under such circumstances as the withdrawal of his guardian; upon being left alone; or confined to seclusion in his cage; or else in the presence of frightening stimuli (e.g., a stuffed wolf, a panther skin, large live animals, such as horses or cows), the infant chimpanzee begins to *cry* (Figure 4). His mouth is wide open so that the teeth and gums can be plainly seen, and the head is slightly tilted backwards. The ape emits a continuous deafening roar, somewhat resembling the crying of a child, but incomparably louder. *No tears are ever to be seen*, which seems to be quite a characteristic feature. The paroxysm of crying behavior is marked by complete closing of eyelids and wrinkling upper part of face.

The expression of *joy* (Figure 3) is marked by entirely opposite facial movements. A kind of smile can be seen; the corners of the lips are slightly lifted; the mouth is open, and panting can be heard (but no laughter is ever to be observed). The joy-causing stimuli are exactly opposite to those causing depression or sadness, viz: permission to leave cage; arrival of guardian; caress on his part; playing or wrestling with him; and tickling; and all such stimuli invariably evoke a smile or broad grin accompanied by "bustling" movements and invitation to play or "enticing" gestures.

The chimpanzee's *anger* (Figure 5) is characterized by wrinkling of upper half of the face, straining of lips down-

wards, not only teeth but also gums being plainly visible. The provoking stimulus is the appearance of various supposedly offending animals or objects which the chimpanzee is likely to attack (hens, dogs, cats). Angry behavior is also to be observed with regard to strange people or in connection with protecting the objects which the ape understands to be his property. Again, anger is likely to be observed when the chimpanzee is being punished, and is always the case when some attack or assault is made upon the ape. Anger is expressed by a short hallooing sound, a threatening gesture of the hand, clenching of fist, and finally striking the offending stimulus.

*Anxiety* and *excitement* (Figure 6) are expressed in a trumpet-like projection of the lips, bristling of hair on face and body, and the vocalization of modulated, long "oh-oh" ing sounds, which are a sixfold repetition of higher and lower pitched tones taken over a tierce within the octave.

A less pronounced form of excitement is expressed only by bristling of hair and protrusion of lips, and is a usual preliminary to the onset of the usual affective emotions of the ape: anger, fear-tantrum, buoyant joy, despair.

The greatest excitement is usually accompanied by the ape standing vertically erect and extending arms towards the intriguing stimulus. If the emotion is not interrupted for some time the ape will repeatedly crouch down and again stand up erect.

The conditions likely to call forth maximum excitement are as follows: especial unexpectedness or novelty of exciting stimulus; also—lack of direct purport of stimulus and concomitant absence of specific response on the part of the ape. A concrete example: the chimpanzee was confronted with the sham fight of two men armed with truncheons and seemingly attacking one another. The make-believe combat was accompanied by loud shouting and much rattle and noise. The chimpanzee responded by plainly expressed maximum general excitement.

(In this connection it might perhaps be worth mentioning that Darwin, in his book on expressions of sensation, interprets the trumpet-like protrusion of lips as a sign of anger; such a conclusion according to my observations by no means corresponds to reality.)

In each of the six photographs, only the face and a small portion of the chest and forearms are shown. The particular view or angle

of photography used in each picture appears to be best suited for illustrating the specific facial configuration of that picture. These views might be roughly classified as one front, four semi-front, and one side view. The six photographs were 7 x 7½ inches in size, and were printed on heavy gloss paper, 8 x 10 inches in dimensions. Each print was in turn attached, by means of mounting corners, to a heavy white cardboard back, 10 inches wide and 12 inches high, so that a 1-inch border framed the picture on all sides in addition to the border on the print itself. There was no mark or name on any of the six pictures.

Each subject, seated as close to the front center of the classroom as possible, was provided with a large mimeographed sheet containing full directions for the experiment as well as spaces for indicating his individual judgments. This sheet is reproduced in condensed form below:

Name ..... Class ..... Sex .....

#### JUDGMENT OF EMOTIONAL EXPRESSION

in the chimpanzee

**DIRECTIONS:** This is a test of your ability to judge emotion in the chimpanzee from photographs of facial expression. Below is a list of 16 different emotions, lettered from A to P, inclusive. Read over the list carefully. Six (6) pictures of the same chimpanzee, each expressing a different emotional state, will be presented one at a time. The exposure time will be one minute for each picture. As each picture is shown, place the letter corresponding to the emotion expressed in the picture opposite the number of that picture. Write only one letter opposite each number, and leave no numbers blank. If you are not sure, guess. The same letter may be used for more than one picture if necessary.

#### LIST OF EMOTIONS:

- A surprise, astonishment, bewilderment
- B anger, rage
- C hate
- D longing, hope, desire
- E quietude, contentment
- F interest, curiosity
- G friendliness
- H disgust, loathing
- I tenderness, sympathy
- J laughter, joy
- K sexual excitement
- L sadness, grief
- M weeping, physical pain, suffering
- N fear, horror, dread

O excitement, agitation  
P stubbornness

PICTURES	CORRESPONDING EMOTIONS
1	.....
2	.....
3	.....
4	.....
5	.....
6	.....

ANSWER THE FOLLOWING QUESTIONS AS BEST YOU CAN:

1. Have you seen these pictures before? ..... If so, where? .....
2. Have you ever had any opportunity to make frequent observations on monkeys or apes? .....
3. Can you describe the *method* or methods which you used in making your judgments .....

After all subjects had carefully read over the directions and had asked any questions they might have had regarding the procedure, the pictures were held up, one at a time, in full view of all subjects. The presentation period for each photograph was one minute, the subjects being given all the time necessary for judgment between exposures. After closely scrutinizing the picture, each subject glanced over the list of sixteen emotions and merely placed the letter corresponding to the emotion which he thought was portrayed opposite the serial number of that picture. Thus the reactions on the part of the subject were reduced to a minimum. Only one judgment could be made for a given picture, although the same judgment could be used for different pictures, and no omissions were allowed. In order to eliminate the constant error of serial position, with its attendant factors of suggestion, contrast, etc., the order of presentation of the six photographs was changed from group to group. Thus in the four groups which served as subjects, the presentation orders for the six pictures were as follows: (a) 1, 2, 3, 4, 5, 6; (b) 3, 5, 1, 4, 6, 2; (c) 4, 6, 1, 5, 2, 3; and (d) 5, 6, 2, 1, 3, 4. When all judgments were completed the subjects were asked to answer the three questions at the bottom of the sheet as well as possible. These were for the purpose of determining (1) if the pictures had been seen before, (2) previous experience in observing monkeys and apes, and (3) the methods or criteria of judgment.



## SUBJECTS

Table 1 shows the composition and distribution with regard to educational status of the total group of 127 subjects (31 male and 96 female) actually employed in the present study. The judgments of two additional subjects, who had previously seen the photographs, were discarded on *a priori* grounds.

TABLE 1  
DISTRIBUTION OF SUBJECTS

Academic level	Barnard female	Columbia	
		male	female
Freshmen	42		
Sophomores	12		
Juniors	14		
Seniors	9	3	2
A.M.		27	16
Ph.D.		1	1
Total	77	31	19

The group of 77 undergraduate Barnard women were members of classes in elementary and quantitative experimental psychology. The Columbia group of 31 men and 19 women consisted almost entirely of graduate students, mostly candidates for the M.A. degree. All of the Columbia subjects were members of a graduate survey course in comparative psychology.

## RESULTS

Inspection of Table 2 will at once show *wide individual differences* in the judgments on each of the six photographs. In fact there are but few of the 16 emotions which have not been given at least once for each picture, regardless of the facial expression actually portrayed. Had the number of subjects been larger, it is very probable that no blanks whatsoever would have resulted, i.e., each photograph would have been judged as portraying each of the 16 emotions by some one or more subjects. These differences in opinion were less, however, in the case of certain photographs, such as No. 5 (anger, rage); whereas the greatest differences occurred in the case of No. 1 (quietude, contentment) and No. 3 (laughter, joy),

TABLE 2  
JUDGMENT OF EMOTION IN THE CHIMPANZEE

Photographs	Group (N=127)	Judgments														P
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
		Surprise, astonish- ment, bewil- derment	Anger, rage	Hate	Longing, hope, desire	Quietude, contentment	Interest, curiosity	Friendliness	Disgust, loathing	Tenderness, sympathy	Laughter, joy	Sexual excitement	Sadness, grief	Weeping, physical pain, suffering	Fear, horror, dread	Excitement, agitation
1																
Quietude, contentment (E)	Male	1	2	0	0	3	1	0	2	0	0	0	18	1	1	0
	Female	4	0	1	2	24	15	6	2	6	2	0	27	0	2	0
	Total	5	2	1	2	27	16	6	4	6	2	0	45	1	3	0
2																
Sadness, grief (L)	Male	3	0	0	4	6	5	5	0	4	0	1	3	0	0	0
	Female	8	0	0	8	15	30	7	1	12	2	0	9	2	1	1
	Total	11	0	0	12	21	35	12	1	16	2	1	12	2	1	0
3																
Laughter, joy (J)	Male	1	4	1	1	0	2	2	0	1	3	2	0	9	1	4
	Female	2	21	4	8	2	5	6	2	0	20	0	3	14	4	5
	Total	3	25	5	9	2	7	8	2	1	23	2	3	23	5	9
4																
Weeping, phys. pain, suffering (M)	Male	4	3	0	0	0	0	0	0	0	5	2	0	7	5	5
	Female	14	10	2	1	0	1	4	1	0	15	0	0	20	17	11
	Total	18	13	2	1	0	1	4	1	0	20	2	0	27	22	16
5																
Anger, rage (B)	Male	0	6	2	1	0	0	2	1	0	17	0	0	2	0	0
	Female	0	14	5	1	0	1	4	9	1	44	3	0	7	2	4
	Total	0	20	7	2	0	1	6	10	1	61	3	0	9	2	4
6																
Excitement, agitation (O)	Male	8	0	0	3	2	11	1	0	0	3	2	0	0	0	1
	Female	13	0	0	7	21	17	10	1	9	2	6	4	0	1	0
	Total	21	0	0	10	23	28	11	1	9	5	8	4	0	1	0

each of which shows a stable number of judgments in almost every possibility. Individual differences are so large that it is useless to attempt a separate analysis of each photograph. Owing to the relatively small number of male subjects (39), adequate sex comparisons cannot be made, although inspection of the original data shows no real differences of opinion. The enormous scatter of the judgments for both sexes, however, would seem to indicate that reliable *sex differences* in the judgment of facial expression in the chimpanzee are extremely small and probably non-existent.

Perhaps the most pertinent question is that of the *accuracy* of judgment of chimpanzee expression. The data show beyond question that such judgments are far from correct. In only one of the six cases does the modal group judgment correspond to the actual facial expression of the chimpanzee, and even here the range is enormous. Thus in the case of photograph No. 4 (weeping, physical pain, suffering) 27 out of the total group of 127 subjects (or only 21%) judged the picture correctly, and other emotions received the practically equivalent frequencies of 22, 20, 18, 16, 13, etc. It is also interesting to note that this photograph (No. 4), although showing the only correct modal judgment, nevertheless shows by no means the least variability or range of judgment. In other words, photographs about which the subjects were in most accord were not necessarily those most correctly judged. The largest number of identical opinions was registered in the case of photograph No. 5 (anger or rage), 61 (or 48%) of the total group judging this photograph to express laughter or joy.

The large range and variability and low degree of accuracy make it almost impossible to determine the relative amount of error in the judgment of each of the six photographs, in answer to the question of the *relative identifiability of various facial expressions in the chimpanzee*. If only the number of correct judgments is considered, the following rank order, in terms of decreasing frequency of correct identification, is obtained for the group as a whole:

		Correct judgment	
		Frequency	Percentage
1.5	No. 1 (quietude, contentment)	27	21
1.5	No. 4 (weeping, phys. pain, suffering)	27	21
3	No. 3 (laughter, joy)	23	18
4	No. 5 (anger, rage)	20	16
5	No. 2 (sadness, grief)	12	9½
6	No. 6 (excitement, agitation)	0	0

It has been stated above that *subjective agreement with regard to the emotion portrayed does not necessarily indicate correctness of objective agreement*. This can be demonstrated by ranking the six photographs in decreasing order according to their modal judgments or single most frequently judged category or emotion (i.e., subjective agreement), and comparing this rank with the rank order of the photographs in terms of decreasing frequency of correct identification (i.e., objective agreement), as given above.

Rank	Photograph	Modal judgment	
		Frequency	Percentage
1	No. 5 (anger, rage)	laughter, joy (J)	61 48
2	No. 1 (quietude, contentment)	sadness, grief (L)	45 35½
3	No. 2 (sadness, grief)	interest, curiosity (F)	35 27½
4	No. 6 (excitement, agitation)	interest, curiosity (F)	28 22
5	No. 4 (weeping, phys. pain, suffering)	weeping, phys. pain, suffering (M)	27 21
6	No. 3 (laughter, joy)	anger, rage (B)	25 19½

Inspection of these data will show beyond doubt that subjective agreement or consistency of opinion is in no way related to correctness of judgment. The correlation coefficient, computed by means of the Spearman Rank-difference formula, is  $-.10$ , or a chance deviation from zero.

A further interesting and related question is that of the *direction of error of the judgments*. This problem can be answered by concomitant inspection of the photographs and data, as well as by perusal of the methods of judgment introspectively reported to have been employed. In general, it is seen that on those photographs exhibiting the most pronounced error of judgment, the direction of error was usually toward the human. In other words, the subjects tended to judge (or "misjudge") the facial configurations of the chimpanzee as if they had been those of a human. This *anthropomorphic tendency* can be easily demonstrated by individual analysis of the photographs.

Photograph No. 1, illustrating quietude or contentment, was correctly judged by 27, or 21% of the subjects; whereas it was judged sadness or grief by 45, or 35½% of the observers. When judged in terms of human criteria, the eyes of the chimpanzee here appear



wistful, and the entire countenance appears passive and dejected. In contrast, photograph No. 2, actually illustrating sadness or grief, was correctly judged by only 12, or  $9\frac{1}{2}\%$  of the subjects; whereas it was judged interest or curiosity by 35, or  $27\frac{1}{2}\%$  of the judges. Anthropomorphically speaking, the eyes in this photograph show a merry twinkle, the mouth is compressed and slightly protruded, and the entire countenance seems to be one of active interest.

Photograph No. 3, depicting joy or laughter, was correctly judged by 23, or 18% of the observers; while 25, or 18% judged it to be anger or rage, the exactly opposite reaction pattern, and 23, or 18% judged it to be weeping, physical pain, or suffering. Photograph No. 4, actually illustrating weeping, pain, or suffering, was so judged by 27, or 21% of the subjects, this being the only case in which the correct judgment was most frequently made. There was still much disagreement of opinion, however, as the photograph was judged fear, horror, or dread by 22, or 17% of the subjects, and joy or laughter by 20, or 16%. Photograph No. 5, showing chimpanzee anger or rage, was correctly judged by only 20, or 16% of the subjects; whereas the amazing total of 61, or 48% termed it joy or laughter, a diametrically opposite reaction pattern.

Each of the three last mentioned photographs (Nos. 3, 4, 5) depicts the chimpanzee with mouth open and teeth more or less prominently shown. This community of corresponding features probably accounts for the confusion and wide range of judgments made by the naive subjects in terms of human criteria. Actual knowledge of chimpanzee behavior, however, will quickly serve to differentiate these photographs. The lack of deep wrinkles around the eye regions, and especially the complete covering of the upper dentition by the upper lip, as well as the lifting of the corners of the lips, definitely marks this facial pattern as that of joy or laughter. The term "laughter" is here used in a restricted sense, as some authors maintain (cf. Kohts, above) that laughing is never found in the chimpanzee, although it would seem that such an interpretation itself appears to be slightly anthropomorphic in character. In photograph No. 4, showing weeping, physical pain, or suffering, the head is tilted backwards, the mouth is open wide, and the tongue has receded, as in weeping, screaming, or loud vociferation. Similarly, close inspection of photograph No. 5, anger or rage, shows



marked furrows around the eyes, nostrils, and upper half of the face, and the upper lip is drawn up so that the upper teeth and gums are plainly visible.

Lastly, photograph No. 6, depicting excitement, anxiety, or agitation, was not correctly judged by any of the 127 subjects; whereas it was judged as interest or curiosity by 28, or 22% of the subjects, as quietude or contentment by 23, or 18%, and as surprise, astonishment, or bewilderment by 21, or approximately 16%. The trumpet-like projection of the lips is perhaps the most differentiating criterion of this pattern of facial expression, and typifies a characteristic and very common type of affective reaction in the chimpanzee.

It should be noted that Darwin (24) was well aware of the wide differences in emotional expression both within the infrahuman primates and between the apes and man. After stating (p. 132) that "the various species and genera of monkeys express their feelings in many different ways," Darwin proceeds to describe the emotional states of pleasure, joy or affection, anger, astonishment, terror, and what he terms the painful emotions and sensations, including pain, grief, vexation, and jealousy. The following quotations illustrate Darwin's point of view with respect to expressive reactions of monkeys and apes.

Some kinds, which have moveable ears, and which fight with their teeth—for instance *Cercopithecus ruber*—draw back their ears when irritated just like dogs; and they then have a very spiteful appearance. Other kinds, as the *Inuus ecaudatus*, apparently do not act thus. Again, other kinds—and this is a great anomaly in comparison with most other animals—retract their ears, show their teeth, and jabber, when they are pleased by being caressed. I observed this in two or three species of *Macacus*, and in the *Cynopithecus niger*. This expression, owing to our familiarity with dogs, would never be recognized as one of joy or pleasure by those unacquainted with monkeys. (p. 114)

Although the countenances, and more especially the gestures, of oranges and chimpanzees are in some respects highly expressive, I doubt whether on the whole they are so expressive as those of some other kinds of monkeys. This may be attributed in part to their ears being immovable, and in part to the nakedness of their eyebrows, of which the move-

ments are thus rendered less conspicuous. When, however, they raise their eyebrows their foreheads become, as with us, transversely wrinkled. In comparison with man, their faces are inexpressive, chiefly owing to their not frowning under any emotion of the mind. . . . Frowning, which is one of the most important of all the expressions in man, is due to the contraction of the corrugators by which the eyebrows are lowered and brought together, so that vertical furrows are formed on the forehead. Both the orang and the chimpanzee are said to possess this muscle, but it seems rarely brought into action, at least in a conspicuous manner. (pp. 142-143)

Darwin concludes (p. 367) that the study of emotional expression in various phyletic forms "confirms to a certain limited extent the conclusion that man is derived from some lower animal form." Since he considered expression to be innate or inherited (cf. 24, p. 351), Darwin failed to consider adequately the vast differences in cultural and stimulatory backgrounds which might easily account for many of the differences in facial expression of emotion in forms whose morphology is so strikingly similar.

Lastly, we come to the question of the *various methods introspectively reported to have been employed* by the subjects in making their judgments as to the various emotions portrayed in each of the six photographs. This classification, like any other of its kind, is often faulty and even questionable, but is made solely for the sake of logical clearness and brevity. The replies have been roughly classified into seven general categories, two of which comprise two or more subclasses. Description of the method itself as well as data on its ramifications and frequency of use are given. Typical examples of each method are also listed under the appropriate classification, the exact terminology of the subject being reported. It should be clearly kept in mind while considering this classification that in a great many cases the subjects reported having used a *combination* of two or more of these methods. It will be recalled that no suggestions or leading questions were given to the subjects, so that the methods reported represent a more nearly adequate picture of what the subject actually did in making his judgment.

*Method I: Pure Guess, Chance, Blank, or "No Method" of Judgment of Expressive Facial Reaction.* This method, if it may

be called such, ranked second in frequency of use. It was reported to be the only method employed by 38 of the 127 subjects; and many others reported it as combined with other methods, i.e., having guessed with regard to certain photographs, and used different methods for judging others. Typical examples follow:

Guessed what the emotion was, and found the corresponding letter in the list.

Spontaneous reactions. I doubt whether my judgments are reliable, since I might change them on retrospection.

Guessing. No certainty.

Never sure of my judgments, since every time, there seemed to be several possibilities—not one. Judgments were largely chance.

Most of it was pure guess work.

I might as well leave this question blank.

*Method II: Comparison of Expressive Facial Reaction with That of Other Organisms.*

*a. Comparison with modern human adults.* This anthropomorphic method of judgment was by far the most frequently employed, being reported by 94 of the 127 subjects. This serves as additional evidence regarding the question of the direction of error of the judgments, discussed above. Examples are:

The only method I used in making my decisions was comparison of these expressions with any similar expressions I have noticed of human beings and that I knew the cause of and so associated with a particular emotion.

Comparison with human expression of these emotions.

Judging by, or from analogy with human behavior.

I based my judgment on human expression—the way people react to different stimuli.

Impulsive reaction, verified by comparison with my knowledge of human expression.

Related them to human stereotypes.

Anthropomorphically—inferring emotions from observed similarities to human stereotyped facial expressions.

*b. Comparisons with human infant.* This method, as well as those listed immediately below as coordinate headings, was very infrequently used, having been reported by but two subjects. Examples:

By a close correlation with infant expression; also adult expression, but not as much as infant.

Tried to compare expressions with those of baby or small child.

c. *Comparison with primitive man.* Only one subject directly reported having used this method, although a second example, also given below, possibly infers the same. Examples:

Analogy—mostly—considered emotions as expressed by primitive man, who had not yet learned to curb his emotions culturally.

None, except by human comparison. Where a choice was possible, I judged the simpler or more primitive.

d. *Comparison with infrahuman animals.* This method was employed by 10 subjects. Among the animals whose recalled expressions served as criteria for judgment were the ape, monkey, dog, and cat. Typical examples follow:

I compared these photographs with the actions of apes and monkeys at the Zoo.

Try to find similarities to monkeys and dogs.

e. *Comparison with other criteria, such as*

1) *Other photographs in the present series.* Although such a method would be quite hazardous, owing to the serial rather than group presentation of the photographs, this procedure was reported by 2 subjects.

By comparison with other pictures shown.

2) *Previously seen human photographs.* Reported by one subject.

I was frankly anthropomorphic and attempted to remember human sets of pictures, such as those of Ruckmick.

3) *Previously seen animal photographs and movies.* Reported by 3 subjects.

Compared with photographs of monkeys which I had previously seen.

Recalled the two movies I saw of apes in which the emotion was incidentally mentioned.

4) *Conventional standards.* Six subjects specifically reported having used this criterion, although it is quite likely that some of those classified under Method V below might also have been included in this category.

Decided according to conventional standards.

Stock expressions of emotions.

5) *General previous experience or information.* Reported by 4 subjects.



I tried to think of a time when I saw these expressions, and then thought of what occurred at that time.

Judged from what I have previously heard about such emotions.

6) *Previous descriptive text.* Reported by one subject. Decision based on Darwin's "The Expression of Emotions" and similar descriptions of facial contortions in emotion.

*Method III: Imagined Completion of Stimulus Situation, i.e., Visualizing Events or Stimuli Which Might Have Elicited the Expressive Facial Reaction.* This method, reported to have been frequently used in previous studies by Ruckmick (129,130), Sherman (133,134), and others, relates to judgment of the emotions portrayed in the photograph solely in terms of the stimulus or stimuli supposed to have called for the response. Such a method was mentioned by 11 of the 127 subjects, although it is probable that it was unknowingly employed by many others. Typical examples follow:

Trying to imagine what occasions, or what causes might have evoked such an expression.

I wondered how the chimpanzee was placed in such an emotional state, and tried to judge on that basis.

*Method IV: Imagined Completion of Stimulus Situation, i.e., Visualizing Gestures, Bodily Postures, and Vocalizations Which Might Have Accompanied the Expressive Facial Reaction.* This method is in reality the complement of the one above. Whereas the former deals with elaboration of the imagined stimulus pattern, the present method implies elaboration of further unpictured but associated details of the response pattern. The subjects evidently considered such associated reactions as more stable and adequate criteria for judgment. This method, however, was infrequently employed, having been reported by but 4 subjects. Examples:

Tried to imagine what the chimpanzee would do.

I imagined shrieks and cries of the chimpanzee and judged the photographs accordingly.

Thought of the way the animal would act if he were there before me.

*Method V: Empathy or Sympathetically Imitated Expressions, i.e., Assumption by Judges of Mental and Bodily Attitudes Portrayed in Photographs.* This method, reported employed in previous studies by Feleky (38), Langfeld (95), and others, was re-



ported by 29 observers in the present study. Such a method was frequently found employed in combination with the anthropomorphic method, listed as Method II above. Examples follow:

Put face muscles in as similar a state as possible, and judged from my feelings.

Empathy—tried to assume expressions (in imagery, of course).

I compared them with my conception of how human beings feel when they look like the pictures.

Empathy of facial musculature.

I tried to imagine how we would feel and what we would say if we had a facial expression like that.

I tried to feel myself into his situation—to determine what he was looking at, etc.

Tried to imagine how I'd feel with that expression on my face, but was handicapped because I'm not a chimpanzee.

*Method VI: Analysis of Expressive Facial Reaction Impersonally and Objectively.* Under this atomic method may be listed cases in which the subject based his decision upon some element or combination of elements in the photograph, without direct reference to his own feelings, imagination, or past experience. The *eyes* and *mouth* were most frequently employed in such a judgment, being specifically mentioned 26 and 22 times, respectively. Other parts given especial and detailed consideration by a smaller number of judges were the *teeth*, *nose*, *head*, *lips*, *brow*, *shoulders*, *arms*, *wrinkles*, and *general tension of facial musculature*. Typical examples follow:

The eyes are most expressive.

By angle of mouth, if teeth were showing, and how eyes appeared—if narrow or not.

Mouth and eyes most expressive.

From analysis of position of shoulders, head, and arms, showing whether relaxed or not.

I tried to judge the emotion by the expression of the eyes and shape of the lips.

I interpreted muscular tension around the mouth and eyes to mean more intense emotions. After judging the intensity, I tried to judge from expression of eyes and mouth, such as if mouth was open, etc.

It is typical that in four of the photographs the dynamics of the picture were down like this ↘, and in two they were up like this ↗.

*Method VII: Miscellaneous Methods.* Here may be listed such unusual methods as

a. *Judgment in terms of the emotion induced in the subject by the expressive facial reaction.* Such a method is to be differentiated from empathy, for here the subject makes no attempt to assume the reactive state portrayed in the photograph, but merely judges the emotion directly in terms of his affective reaction to the photograph. There was but one example:

I seemed to be influenced by the emotion I got by looking at the photograph of the animal.

b. *"A priori" judgment in terms of the frequency and hence the degree of probability of the expressive facial reaction in infra-human primates.* Two subjects reported such a method:

From opinions about the frequency of such emotional situations with monkeys, e.g., *a priori* I decided none would show "hope," etc.

I eliminated from consideration immediately all the finer, more "human" emotions such as D and I. Then for the rest  
I . . .

The common lack of ability to judge such facial expressions of the chimpanzee, as well as the frequent confusion of physical pain or suffering, rage or anger, and joy or laughter, is exhibited by a popular motion picture, "School Pals," depicting some curious antics of a chimpanzee. At the conclusion of this picture, when the chimpanzee had just "played a trick" upon his adversary, it was desired to convey to the audience the impression that the chimpanzee was laughing. The animal's hand, hidden from direct view behind a board fence, was pinched or otherwise painfully stimulated. This immediately elicited the typical facial expression of rage or anger, which was interpreted by the audience as joy or laughter. Such enormous differences in emotional expression between chimpanzee and man, as well as the demonstrated inability of man to judge such expressive reactions, illustrate the need for more intensive study of primate behavior patterns, especially as influenced by social or cultural stimulation. When we realize the close similarity between man and chimpanzee in anatomico-physiological makeup, and recognize that the chimpanzee more closely resembles man affectively than in the so-called intellectual or cognitive functions (cf. Yerkes, 1953), the need for such a study becomes increasingly apparent.

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## LE JUGEMENT DE L'EXPRESSION FACIALE DE L'ÉMOTION CHEZ LE CHIMPANZÉ

(Résumé)

Après un résumé systématique et documenté du grand nombre d'écritures sur le jugement de l'expression faciale des émotions, l'auteur montre qu'à peu près toute la grande quantité d'oeuvre expérimentale dans ce champ s'est occupée du jugement humain de l'expression humaine. Le but de cette étude, cependant a été l'investigation du jugement humain de l'expression faciale chez le chimpanzé. On a employé six photographies qui représentent les émotions de (1) quiétude, (2) tristesse, (3) joie, (4) larmes, (5) colère, et (6) agitation, avec la permission spéciale de N. Kohts, du Laboratoire de Zoopsychologie, Museum Darwinianum, Moscou, U. R. S. S. Les membres d'un groupe total de 127 étudiants (31 mâles, 96 femelles) ont jugé les photographies présentées en série en choisissant l'émotion appropriée sur une liste miméographiée de 16 émotions qu'on leur a donnée.

Les résultats ont montré de grandes différences individuelles dans le jugement de chacune des six photographies, bien qu'on n'ait trouvé nulles différences constantes de sexe. Le nombre des jugements corrects pour chaque photographie a été approximativement le même qu'on trouverait par le hasard, et la variété des jugements pour chaque photographie a été exceptionnellement grande. Les photographies à l'égard desquelles les sujets ont montré le plus d'accord n'ont pas été nécessairement celles le plus correctement jugées. On a trouvé une tendance anthropomorphique marquée, démontrée et par l'analyse individuelle des photographies et par l'examen détaillé et la classification des diverses méthodes de jugement dont l'emploi a été introspectivement rapporté.

FOLEY, JR.

## DIE BEURTEILUNG DES EMOTIONALEN GESICHTSAUSDRUCKS BEIM SCHIMPANSEN

(Referat)

Nach einem systematischen und einer beurkundeten Übersicht der grossen Fachliteratur über die Beurteilung des Gesichtsausdrucks der Emotionen weist der Verfasser darauf hin, dass fast die ganze experimentelle Forschung auf diesem Gebiet sich mit der menschlichen Beurteilung des menschlichen Ausdrucks beschäftigt hat. Der Zweck des vorliegenden Studiums war aber die Untersuchung der menschlichen Beurteilung des Gesichtsaus-

drucks beim Schimpansen. Sechs Aufnahmen, die die Emotionen von (1) Ruhe, (2) Traurigkeit, (3) Freude, (4) Weinen, (5) Zorn, und (6) Aufregung darstellten, wurden durch die Sonderlaubnis von N. Kohts des Laboratoriums für Tierpsychologie, Museum Darwinianum, Moskau, U. S. S. R. verwandt. Eine Gesamtgruppe von 127 Studenten (31 männlichen, 96 weiblichen) beurteilten die Reihe von Aufnahmen durch die Auswahl der geeigneten Emotion aus einer Liste von 16 Emotionen, die ihnen vorgelegt wurde.

Die Ergebnisse zeigen grosse individuelle Unterschiede in der Beurteilung jeder der sechs Aufnahmen auf, obwohl keine gültigen Geschlechtsunterschiede gefunden worden sind. Die Anzahl der richtigen Urteile für jede Aufnahme war ungefähr die, die durch Zufall entstehen würde, und die Verschiedenheit der Urteile für jedes Bild war aussergewöhnlich gross. Die Aufnahmen, über die die Vpn. am meisten in Übereinstimmung waren, waren nicht notwendig die jenigen, die am meisten richtig beurteilt wurden. Eine ausgesprochene anthropomorphische Neigung wurde festgestellt und durch sowohl die individuelle Analyse der Aufnahmen als auch durch die ausführliche Untersuchung und Einordnung der verschiedenen Methoden der Beurteilung dargelegt, die durch die Selbstbetrachtung zur Verwendung angegeben wurden.

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# EFFECT OF KNOWLEDGE UPON ATTITUDES TOWARDS THE NEGRO\*<sup>1</sup>

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## I. INTRODUCTION

The recent development of techniques for the measurement of attitudes has made possible the objective analysis of many important problems in the field of social psychology. Two of these problems which have been analyzed by the techniques for attitude measurement are racial preferences and the effect of social stimuli in causing a change in attitude towards specific issues.

Investigations of racial attitudes reveal among representative American college and university groups a greater antipathy towards the Negro than is felt towards most other nationalities or races included in the comparisons made. Bogardus (1) in a study of social distance to determine *how* and *why* the grades of understanding and intimacy which characterize pre-social and social relations vary, asked a group of 248 graduate and upper-division students to classify a list of 36 racial and language groups to show whether they experienced towards them a friendly feeling, a neutral attitude, or a feeling of antipathy and dislike. The greatest number of subjects expressed antipathy towards the Turk, the second greatest number, towards the Negro, and the third, towards the Mulatto.

In another study Bogardus (2) investigated the degree of social intimacy to which individuals reported themselves as willing to admit certain racial groups. The degrees of intimacy varied from inter-marriage down to admission of the members of the group as visitors to this country. In this study the Turk received the lowest rank and the Negroes came next in order.

Thurstone (10), in a study to show that the law of comparative judgment can be applied to the measurement of nationality pref-

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erences, had 239 students, who represented a heterogenous racial group, to indicate their preferences for 21 nationalities. The instructions were to indicate in the case of each comparison the one of each nationality or race he would rather associate with. The rank order of the 21 nationalities obtained by summing the experimental proportions of preferences gave the Negro the lowest rank of all the nationalities considered. The results of this study show very definitely that the Negro is less acceptable socially to American students than the other representative nationalities included in the comparison. Guilford (6), in a study to test the method of paired comparisons as applied to the measurement of racial attitudes, had about 1100 students from seven different colleges located in different sections of the United States to indicate by the paired comparisons method which of fifteen races they would prefer to admit into their country as fellow citizens. He tabulated the results from the different groups separately and found a great unanimity of opinion in all of the schools except New York University. A comparison of the attitudes expressed toward the different races showed that only two races, the Turks and the Chinese, were ranked below the Negro in order of preference for admission as citizens.

Katz and Allport (9) in the Syracuse study of the attitudes of college students included snobbishness in college life as one of the problems of investigation. The specific purpose of the study was to determine the relative exclusiveness of the fraternity and the non-fraternity groups. The fraternity members were asked to indicate whether they would admit certain racial and social types to membership in their fraternity and the non-fraternity students were asked to indicate if they would admit the types to their rooming-house as a potential room-mate. Of the thirty types considered the Negro group ranked lowest in preference as shown by the number of students who were willing to admit its members to fraternities and student rooming houses. Only 5 per cent of 3,408 Syracuse students were willing to admit Negroes and since this five per cent included the Negro students on the campus, there were only a few white students who were willing to live with Negro students. The prejudice against the Negroes and other undesirable groups, Hindus, Turks, Orientals, and Greeks, was distributed rather uniformly through the different college groups of the university and shows that the relative social distances of these groups are stable and constant throughout the entire cultural pattern.

Garrison and Burch (5) made a study in which the major problem was to determine the amount and nature of anti-Negro prejudice existing among students at North Carolina State College. They had 163 students from the freshman, sophomore, junior, and senior classes to indicate whether 35 statements expressing certain attitudes towards the Negro are true or false. The statements were taken with slight modifications from the questionnaire of the Social Science Research Council on racial attitudes. Analysis of the percentage of students endorsing the various statements as true shows that this group of southern students favor the continuance of the southern system of social segregation of the Negro race. The statement, "Negroes should not desire social equality with the whites, but should develop a separate culture in America," was considered true by 80.9 per cent of the group (5, p. 232). Only 21.4 per cent of this group of students were in favor of granting full political equality to the Negro.

In his theoretical discussions of the techniques for measuring attitudes (11, 12, 14) Thurstone has suggested that it is possible to use a statement scale of opinion constructed by the method of equal-appearing intervals to measure changes in attitude toward specific objects or issues. He and his students have made a number of such studies. He has shown (13) that it is possible to measure the effect of a single motion picture on the attitudes of children towards the Chinese. He found that a comparison of the mean scores made by 182 children on a scale for measuring attitudes towards the Chinese, given before and after they saw a film favorable to the Chinese, showed a reliable difference that indicated a more favorable attitude as a result of seeing the picture. The difference between the mean scores made by a second group who saw a picture unfavorable towards the Chinese was not reliable, but the author says that it was difficult to find a film that was very unfavorable towards the Chinese. Thurstone, with the aid of Miss Ruth Peterson, has also measured the effects of a motion picture film on the attitudes of children towards the Germans and of a film dealing with gambling on the attitudes of children towards this crime. In these experiments it has been shown that the effects of social stimuli on attitudes can be measured.

Droba (3) has recently studied the effect of education on attitudes towards the Negro. Two methods were used. The first was to

compare scores made on the Hinckley scale for measuring attitudes towards the Negro given at the beginning and at the end of a course in sociology dealing with the Negro race problem. The second method was to compare the scores made on one form of the Hinckley scale by successive educational classes. Three class groups, juniors, seniors, and graduate students, were included in the comparison. The 70 students taking the course in sociology were told to fill in their names if they wanted to. Only 30 gave their names on both forms of the scale and, therefore, 40 records could not be included in the study. It is probable that the 30 who signed their names were more liberal in their attitudes towards the Negro than those who did not. The results reveal a slight tendency for students to become more liberal and more variable in their attitudes towards the Negro after studying the social problems of the race and a tendency for the students who are more advanced educationally to become more liberal in their attitudes towards the Negro. It is unfortunate that the number of subjects was so few and the obtained differences so unreliable as to be only suggestive.

When techniques are developing as rapidly for studying any psychological problem as those for measuring attitudes have been during the past decade, they should be applied under experimental conditions by many different workers so that their effectiveness may be evaluated. The purpose of the present study is to determine the effect of knowledge about the social and educational problems of the Negro race upon attitudes towards the Negro, and to give a brief analysis of the Hinckley Scale of Attitude toward the Negro. A minor problem considered is the relation of intelligence to attitudes towards the Negro.

## II. SUBJECTS AND PLAN OF EXPERIMENT

A questionnaire to determine how the subjects had acquired an acquaintance with the Negro, Form I of a Knowledge Test about the Negro, and the Hinckley Scale of Attitude toward the Negro, Form A, were given to an experimental and to a control group of freshman and sophomore students at the Georgia State College for Women at the beginning of a general course in History of Education in the spring of 1933. There were 78 students in the experimental group and 96 in the control group, but the test records were complete

for only 70 in the first group and for 92 in the second group. All of the students in the experimental group, except one who had a small heritage of Indian blood, were members of the Anglo-Saxon race, and with the exception of one student from South Carolina and one from Oklahoma, were all Georgians. Negro Education in the South was studied as one of the problems of the course by the experimental group but was not studied by the control group. At the end of the course, Form II of the Knowledge Test and Form B of the Hinckley Attitude Scale were given to both groups.

The Thurstone Psychological Examination, 1931 and 1932 Editions, had been given to most of the students soon after their entrance to college. The scores made on this test were used to study the relation of intelligence to attitudes towards the Negro.

The experiment was conducted by the writer, who taught the experimental group and gave the tests to this group. The tests were given to the control group by Miss Marion Keith, Miss Helen Ennis, and Miss Mary Louise Dunn, three advanced students who had been trained by the writer. This group was taught by Miss Ruth Stone, who was asked to avoid any discussion of or reference to the problem of Negro education. Misses Keith and Dunn scored the tests under the writer's direction.

When they finished the first Knowledge Test the students were asked to indicate whether or not they had ever studied the Negro race problem in any course in high school or college. After the last tests were given in May the subjects were asked to indicate their opinion in regard to ten general statements of attitude about the Negro.

### III. THE QUESTIONNAIRE AND TESTS

The purpose of the questionnaire was to determine the circumstances under which the subjects had become acquainted with the Negro and if their acquaintance with individual members of the race had resulted in an attitude of antipathy towards them. The purpose of the first fourteen questions was to determine the attitudes of the subjects towards the Negro servants and laborers whom they had known as nursemaids, cooks, laundresses, chauffeurs, tenants and workmen. The next eight questions were included to ascertain their acquaintance with the churches and schools of the Negro and the purpose of the last one was to determine what business service had



been rendered for them by Negroes. The questions in regard to the servants and workmen were answered either "Yes" or "No." Each of these questions was followed by the question, "Did you like her, him or them," and this type of question was answered "Yes," "No," or with a question mark if the subject had not known the servant or workman. Samples of each of the four types of questions are given below.

1. Those in regard to servants:  
Did you have a Negro nurse when you were a child? Yes      No
2. Those to determine an attitude of antagonism:  
Did you like her? Yes      No
3. Those in regard to acquaintance with churches and schools:  
Have you ever attended a Negro church service in response to a special invitation? Yes      No
4. The one question to determine the types of business service rendered by Negroes:  
Check by underlining the types of business service which you have employed or paid Negroes to render for you:  
shoes shined; tailoring; dry cleaning; shoe repairing; sewing; laundry; nursing, when sick; mail delivery; taxi service; service of hotel waiter; service of bank clerk; service of merchant; service of groceryman (not delivery boy); of dairyman; of maid; of painter; of plumber; of carpenter; of gardener.

The Test of Knowledge of the Negro race was constructed from the literature reviewed by the writer for the preparation of the lectures on Negro Education in the South which were given to the experimental group. Each of the two forms of this test consisted of 25 questions of the multiple-choice type. There are four alternative answers for each question. Fifty questions were compiled and the list was divided into two halves that were in the writer's judgment equally weighted in difficulty and in range of subject matter tested. Two samples of the questions are given below.

Question 9, Form I:

The largest number of Negro schools in the South today are located in:

- (1) villages and small towns
- (2) cities of more than 25,000 population

(3) in the Negro residential sections of towns and cities

(4) in rural areas

Question 18, Form II:

The educational standard attained by Negroes in the South is shown by the fact that:

(1) a large proportionate number of the race graduate from high school

(2) more than 50 per cent of the children complete the work of the elementary school

(3) approximately 70 per cent of the children do not complete the work of the fifth grade

(4) the Negro children get about the same amount of training as the children of the white race.

The Hinckley Scale of Attitude toward the Negro is one of the Thurstone series of attitude scales constructed on the principle of equal appearing intervals (7). This scale and the Thurstone Psychological Examination are so well known that no description of these will be given here.

The ten general questions, which were answered "Yes" or "No" or with a question mark if the student was uncertain of her opinion, were as follows:

1. Do you think that too much time has been spent in taking these tests?
2. Has the study of the Negro problem been of interest to you?
3. Do you consider a study of the Negro race problem of significance to American citizens?
4. Should the southern plan of separate schools for the two races be continued?
5. Should the South continue its policy of requiring Negroes and Whites to ride in separate railway cars and in separate sections on street cars?
6. Should Negroes be given the same educational opportunities as the white man?
7. Should the Negro race be given opportunity to compete in business on equal terms with the white people?
8. Does the Negro race have the ability to make a distinct contribution to American civilization?
9. Do you think the Negro has been exploited by southern property owners?
10. Should America eventually solve the Negro problem by racial amalgamation?

These questions do not represent a single linear attitude continuum in the sense in which Thurstone uses the term (11, pp. 537-538). They are unweighted in value and can be treated statistically only by determining the percentage of students agreeing with each opinion, but they were used for the purpose of aiding in the interpretation of the results obtained from the Hinckley attitude scale.

#### IV. RELIABILITY AND VALIDITY OF THE TESTS

The reliability coefficients of the tests are given in Table 1. The reliability coefficient for the Hinckley Scale of Attitude is  $.305 \pm .073$  for the experimental group and  $.459 \pm .056$  for the control group.

TABLE 1  
RELIABILITY COEFFICIENTS OF TESTS

Test	Group	N	<i>r</i>	P.E.	<i>r</i> stepped- up
1. Hinckley Attitude Scale	Experimental	70	.305	.073	—
2. Hinckley Attitude Scale	Control	92	.459	.056	.629
3. Knowledge Test	Experimental	70	.415	.067	.587
4. Knowledge Test	Control	92	.275	.065	.432
5. Knowledge Test, Form B*	Experimental	70	.567	.054	.723
6. Thurstone Psychological*	Both	144†	.897	.011	.945

\*By the odds-evens method.

†The scores made by the sophomores were omitted because they took the 1930 Edition of the test.

The lower coefficient for the experimental group is to be expected because of a greater variability in the change of attitude of these subjects as a result of their study of the problem of Negro education. The author does not give a reliability coefficient for this scale. The validity coefficients for the tests are given in Table 2. Hinckley has

TABLE 2  
VALIDITY COEFFICIENTS OF THE TESTS

Tests	Group	<i>r</i>	P.E.
	Groups		
1. Hinckley Scale Ratings	I and II*	.980	—
2. a. Knowledge B and Thurstone Test	Experimental	.524	.059
b. Knowledge A & B and Thurstone	Control	.573	.051
c. Knowledge B and Final Grades	Experimental	.493	.061
3. a. Thurstone Test and Final Grades	51 Colleges	.40-.60	—
b. Thurstone Test and Final Grades	Experimental	.612	.052

\*See report of experimental analysis (7).

shown experimentally that the validity of the Attitude Scale was not affected by the attitudes of the groups who ranked the statements from which the scale was constructed. He obtained a coefficient of .980 between the scale values assigned to the statements from which the scale was constructed by a group that was unfavorable in attitude towards the Negro and a second group that was favorable (7, p. 292).

The reliability coefficient of the Knowledge Test for the experimental group is  $.415 \pm .067$  and for the control group is only  $.275 \pm .065$ . This low reliability is due, however, to the limited range of knowledge measured by the test before the students had studied the problem. The coefficient by the odds-evens method for Form B of this test, given to the experimental group after the subjects had studied the Negro problem, is  $.567 \pm .054$  and it is .723 when stepped-up by the Spearman-Brown formula. There is no direct measure of the validity of the Knowledge Test. The coefficient of this test correlated with the Thurstone intelligence test is  $.524 \pm .0529$  for Form B for the experimental group and it is  $.573 \pm .051$  for Forms A and B for the control group. The coefficient for the Thurstone test and final grades is  $.612 \pm .052$  for the experimental group, and for Form B of the Knowledge Test and final grades it is  $.493 \pm .061$  for this group. Form B of the Knowledge Test was given after the experimental group had studied the education of the Negro and these coefficients seem to indicate that the test is a valid measure of the knowledge gained about the problem. The coefficient of the Knowledge Test and the Thurstone intelligence test is another indirect measure of the validity of this test.

The reliability coefficient for the Thurstone Psychological Examination is .941 for the 1928 Edition, .943 for the 1929 Edition, and .950 for the 1930 Edition (15). The authors state that they think the reliability for the 1932 Edition would be approximately the same. The coefficient obtained by the odds-evens method for 144 of the subjects in both the experimental and control groups is  $.896 \pm .011$  and it is .945 if stepped-up by the Spearman-Brown formula. On the basis of reports of the correlation between the Thurstone Psychological Examination and final grades submitted by 51 different colleges the authors suggest that the validity coefficient of the test should be between .40 and .60 (15). The coefficient between the Thurstone test and final grades for the experimental group is  $.612 \pm .052$ .



## V. STUDY OF NEGRO EDUCATION IN THE SOUTH

Since the experiment was conducted in connection with a general course in History of Education the study of Negro education in the South was necessarily limited. Before the first tests were given the students were asked to cooperate with the writer in an experiment. The purpose of the experiment was not fully explained, but the students in both the experimental and the control groups were told that they could cooperate by expressing their opinions frankly and sincerely. They were assured that the results of the experiment would have no effect on their grades in the course. In addition to this the experimental group was requested to learn everything they could about Negro education in the South. They were told that they would not be held responsible on regular class examinations for the facts learned, but that they would take a second form of the Knowledge Test at the end of the course. There was no discussion of the results of the first tests.

At the beginning of the study of the problem the writer gave three lectures on the education of the primitive Negro in Africa and the education of the Negro in the South during the period of Slavery. Each student was then asked to select from the Current Readers' Guide for 1929 to 1932 a current article on Negro education in the South today, and to make a written abstract of the article. The titles of the articles were recorded by the writer and organized into groups dealing with related phases of the problem. These articles were then given by the students as oral reports, one at the beginning of each class period. Each report was followed by a brief discussion of the facts presented. The subjects were asked to take class notes on each report. Since the class met only three times each week and only one report was given each day, some phase of the problem was studied almost every day throughout the entire course. At the conclusion of the study one student in each experimental section gave a term paper on the present status of Negro Education in the South. The experimenter then summarized the phases of the problem studied and asked the students to review their class notes and to try to make as high scores as possible on the second Knowledge Test. The purpose of the method was to eliminate as nearly as possible all factors that might affect their opinions except the acquisition of a greater knowledge about the Negro race, and to make the experimental conditions as nearly comparable to that of the usual classroom teaching as possible.

## VI. RESULTS OF THE QUESTIONNAIRE

Four students in the experimental group failed to answer the question in regard to previous study of the Negro race problem. Of those who answered the question, 97 per cent had never studied the Negro problem in any course in high school or college; three per cent had studied it briefly in the course in American History in high school. Approximately the same proportion of the control group had never studied the problem. The percentages are given in Table 3.

TABLE 3  
SHOWING THE PERCENTAGE OF STUDENTS WHO HAD PREVIOUSLY STUDIED THE  
NEGRO RACE PROBLEM

	Experimental group Per cent	Control group Per cent
1. Had never studied the problem	.92	.92
2. Had studied problem in high school	.03	.06
3. Had studied problem in college	.00	.02
4. Did not say	.05	.00

The results of the questionnaire are given in Tables 4 and 5. Practically all of the subjects had known Negroes as servants and workmen. More than 70 per cent of the experimental group had been nursed by a Negro nurse-maid when they were children and had known Negroes as cooks and laundresses for their families; more than 50 per cent had known Negroes who had been employed for other types of service in their homes, and as tenants or workmen, who were employed by their fathers; more than 30 per cent had attended some service or program at a Negro church, and 23 per cent had visited a Negro school. Only one person had ever attended a school to which both whites and negroes were admitted; and though four per cent had attended the funeral of a valued family servant, only one person had attended the funeral of a Negro who had made a distinct contribution to community life. The percentages for the control group vary very little from those for the experimental group.

The types of business service for which Negroes have been employed by the subjects or by their families are unskilled and semi-skilled trades. The types of service in order of frequency are: laundry, gardening, shining shoes, repairing shoes, dry cleaning, nursing when sick, service of hotel waiter, maid service, carpentering, and painting. Much lower than these rank plumbing, taxi service, dairying, mail delivery, tailoring and sewing.

TABLE 4  
OPPORTUNITIES FOR KNOWING NEGROES

Opportunity	Group	No.		Attitude	
		subjects	Per cent	Yes	?
1. Negro nurse as child	Exper.	51	.73	.78	.20
	Control	71	.77	.90	.07
2. Negro cook in home	Exper.	54	.77	.94	.00
	Control	74	.80	.97	.03
3. Negro laundress for family	Exper.	59	.84	.78	.10
	Control	89	.97	.96	.01
4. Negro chauffeur for family	Exper.	13	.19	.62	.15
	Control	9	.10	1.00	.00
5. Other servants in home	Exper.	47	.67	.75	.06
	Control	68	.74	.94	.03
6. Tenants on father's farm	Exper.	40	.57	.65	.23
	Control	62	.67	.82	.15
7. Workmen in father's business	Exper.	39	.56	.74	.10
	Control	67	.73	.81	.13
8. Attendance at school for both whites and Negroes	Exper.	1	.01		
	Control	2	.02		
9. Visit to Negro church in response to special invitation	Exper.	31	.44		
	Control	31	.34		
10. Visit to Negro church to attend special program	Exper.	25	.36		
	Control	30	.33		
11. Visit to Negro church to learn of services	Exper.	25	.36		
	Control	39	.42		
12. Attendance at funeral of family servant	Exper.	4	.06		
	Control	10	.11		
13. Attendance at funeral of valued workman	Exper.	3	.04		
	Control	5	.05		
14. Attendance at funeral of Negro who had contributed to community life	Exper.	1	.01		
	Control	7	.08		
15. Visit to school conducted for Negroes only	Exper.	16	.23		
	Control	15	.16		

N for experimental group — 70

N for control group — 92

Practically none of the students in either the experimental or control group expressed an attitude of antipathy or dislike for the negroes whom they had known as servants, tenants, and workmen.

## VII. RESULTS OF THE TESTS

It is generally thought that southerners are prejudiced in their attitudes against the Negro. The frequency distribution of scores made on the Hinckley Attitude Scale (Table 6) shows that this group of southern students are not prejudiced in their attitudes towards the social rights of the Negro. The mean scores made on the attitude

TABLE 5  
TYPES OF BUSINESS SERVICE FOR WHICH NEGROES HAVE BEEN EMPLOYED OR PAID

Type of service	Group	No. subjects	Per cent
1. Laundry	Exper.	56	80
	Control	86	93
2. Gardener	Exper.	47	67
	Control	77	84
3. Shoes shined	Exper.	46	66
	Control	66	72
4. Shoes repaired	Exper.	44	63
	Control	66	72
5. Dry cleaning	Exper.	34	49
	Control	52	57
6. Nursing when sick	Exper.	34	49
	Control	72	78
7. Hotel waiter	Exper.	33	47
	Control	40	44
8. Maid service	Exper.	28	40
	Control	56	61
9. Carpenter	Exper.	27	39
	Control	44	48
10. Painter	Exper.	25	36
	Control	38	41
11. Plumber	Exper.	11	16
	Control	14	15
12. Taxi service	Exper.	11	16
	Control	19	21
13. Dairyman	Exper.	9	13
	Control	13	14
14. Mail delivery	Exper.	6	9
	Control	26	28
15. Tailoring	Exper.	6	9
	Control	15	16
16. Sewing	Exper.	6	9
	Control	19	21
17. Groceryman*	Exper.	4	6
	Control	10	11
18. Merchant*	Exper.	3	4
	Control	9	10
19. Bank Clerk	Exper.	0	0
	Control	0	0

\*It is possible that those who indicated service from a Negro merchant or groceryman were really referring to porters for white business men. The explanation, *not delivery boy*, was put in parentheses after groceryman, but this may have been overlooked.

scale by both the experimental group and the control group would classify them as neutral in attitude. Only three individuals on either form of the test made scores that would be interpreted by the author of the scale as indicating prejudice. The one student in the experi-



TABLE 6

FREQUENCY DISTRIBUTION OF SCORES MADE ON FORMS A AND B OF THE HINCKLEY SCALE OF ATTITUDE TOWARD THE NEGRO

Experimental group Score	Distributions		Control group Distributions		Hinckley's interpretation of attitudes toward Negro
	Form A	Form B	Form A	Form B	
9.6-9.9	1				9.0-10.9—Very liberal
9.2-9.5				1	7.0- 8.9—Liberal
8.8-9.1					4.0- 6.9—Neutral
8.4-8.7				1	2.0- 3.9—Prejudiced
8.0-8.3	2		4	3	0.0- 1.9—Strongly prejudiced against the Negro
7.6-7.9	5	1	3	1	
7.2-7.5	11	7	13	3	
6.8-7.1	4	8	15	8	
6.4-6.7	6	13	15	10	
6.0-6.3	4	10	2	18	
5.6-5.9	11	13	17	12	
5.2-5.5	12	8	6	12	
4.8-5.1	4	6	7	13	
4.4-4.7	7	3	5	5	
4.0-4.3	2	1	5	3	
3.6-3.9					
3.2-3.5	1			2	
Total	70	70	92	92	
Mean	5.966	5.943	6.09	5.757	
$\sigma$	1.207	.82	1.06	1.068	

TABLE 7

AVERAGE SCORES MADE ON THE TWO FORMS OF THE HINCKLEY ATTITUDE SCALE AND THE KNOWLEDGE TEST

	Attitude A	Attitude B	Diff.	Knowledge I	Knowledge II	Diff.
Experimental group N — 70						
M	5.97	5.94	.03	9.03	15.26	6.23
$\sigma$	1.21	.82	$\pm .09$	2.78	2.94	$\pm .25$
Md	5.93	6.16	.23	9.5	15.67	6.17
Q	.97	.58	$\pm .12$	1.94	2.22	$\pm .31$
Control group N — 92						
M	6.09	5.76	.33	8.57	12.38	3.82
$\sigma$	1.06	1.07	.08	2.76	2.92	.24
Md	6.51	5.95	.56	9.18	12.93	3.75
Q	.76	.68	$\pm .10$	1.92	2.02	$\pm .30$

$$P.E.M_1 - M_2 = \sqrt{(P.E.M_1)^2 + (P.E.M_2)^2 - 2r_{12} P.E.M_1 P.E.M_2} \quad (8, p. 243).$$

mental group who expressed a prejudiced attitude on the first scale changed to a neutral position after studying the social problems of the Negro. Twenty-seven per cent of those in the experimental group and twenty-two per cent of those in the control group were liberal in their attitude towards the Negro at the beginning of the experiment.

A comparison of the average scores made by the experimental and by the control groups on the two forms of the Hinckley Attitude Scale and the Knowledge Test are given in Table 7 and the differences between the average scores made by the two groups are given in Table 8. The mean scores for Form B of the Attitude Scale are

TABLE 8  
COMPARISON OF AVERAGE SCORES MADE ON THE ATTITUDE SCALE AND THE KNOWLEDGE TEST BY THE EXPERIMENTAL AND THE CONTROL GROUPS

Group	Mean	Median	$\sigma$	Q	Mean	Median	$\sigma$	Q
Attitude Scale Form A				Knowledge Test Form I				
Exper.	5.96	5.93	1.21	.97	9.03	9.5	2.78	1.94
Control	6.09	6.51	1.06	.76	8.57	9.18	2.76	1.92
Diff.	.13	.58			.46	.32		
P.E. <sub>diff.</sub>	.12	.18*			.30	.38		
Diff.								
	1.08	3.24			1.53	.85		
P.E. <sub>diff.</sub>								
Attitude Scale Form B				Knowledge Test Form II				
Exper.	5.94	6.16	.82	.58	15.26	15.67	2.94	2.22
Control	5.76	5.95	1.07	.68	12.38	12.93	2.92	2.02
Diff.	.18	.21			2.88	2.74		
					.31	.47		
P.E. <sub>diff.</sub>	.10	.12						
Diff.								
	1.8	1.75			9.3	5.83		
P.E. <sub>diff.</sub>								

$$*P.E.M_1 - M_2 = \sqrt{(P.E.M_1)^2 + (P.E.M_2)^2} \quad (8, p. 235)$$

slightly lower than those for Form A for both the experimental and the control groups, but the differences are not statistically reliable. The median score for Form B of this scale is .23 higher for the experimental group than the median score made on Form A, but this difference is not reliable. Both groups made a reliable gain on the second form of the Knowledge Test. The higher average score made on Form II of the Knowledge Test by the control group may indicate

that the second form of the test is less difficult than Form I or it may mean that the control group gained a better knowledge of the problem of Negro education from their general reading in the course. The experimental group made, however, a reliable gain on the Knowledge Test as a result of their study of the Negro problem. The mean score for the second form of this test is 2.88 higher for the experimental than for the control group and this difference is 9.3 times its probable error. This comparison of average scores for the two forms of the Attitude Scale and Knowledge Test seems to indicate that a greater knowledge of the Negro race problem gained from a study of Negro education in the South had no effect on the attitudes of this group of students towards the social rights of the Negro. The median score made by the experimental group on Form A of the Attitude Scale is .583 lower than that made by the control group and the median for Form B is slightly higher. The differences are not reliable, but they may show that the actual change in attitude made by the experimental group is not shown by a comparison of the average scores made on the two forms of the Attitude Scale. A specific analysis of the statements endorsed by the majority of the subjects in the two groups seems to confirm this explanation and to show that the lower average score made on Form B of the scale by the experimental group is due to the fact that this form of the scale has fewer statements of attitude than Form A that imply equal social rights without the necessity of social intermixture of the races.

The numbers of the statements on both forms of the Attitude Scale are arranged according to comparable scale values in Table 9 and the percentages of subjects in each group endorsing each statement are given. Statement 6, "The Negro should be given the same educational advantages as the white man," given in Form A receives next to the highest of all the sixteen scale values. This statement implies no social intermixture of the two races and was endorsed by 69 per cent of the experimental group and 75 per cent of the control group. The statement in Form B most nearly comparable to this one in implication in regard to education and in scale value is statement No. 7, "Social recognition should be based on culture, without regard to color." This statement was endorsed by 59 per cent of the experimental group and by 39 per cent of the control group. It may have been interpreted by some to imply social intermixture of the races on the basis of cultural achievement and was not endorsed because of

TABLE 9  
SHOWING THE PERCENTAGE OF STUDENTS ENDORSING EACH STATEMENT ON FORMS  
A AND B OF THE HINCKLEY SCALE OF ATTITUDE TOWARD THE NEGRO

Form A		Exper. group Per cent endors- ing	Control group Per cent endors- ing	Form B		Exper. group Per cent endors- ing	Control group Per cent endors- ing
No. of state- ment	Scale value			No. of state- ment	Scale value		
8	10.3	24	40	8	10.6	31	29
6	9.6	69	75	12	9.9	27	34
2	8.9	17	25	7	9.3	59	39
12	8.3	40	45	3	8.7	14	37
16	7.7	87	91	11	8.1	50	55
4	7.2	84	94	14	7.4	41	35
15	6.6	87	88	15	6.9	97	80
7	5.7	31	20	9	6.0	93	86
1	4.9	73	79	4	5.3	86	92
11	4.2	84	78	1	4.6	96	94
9	3.5	38	70	16	3.7	51	66
14	2.9	73	80	5	3.1	57	70
3	2.3	11	10	13	2.6	4	10
13	1.8	37	41	2	2.0	9	14
10	1.1	1	9	10	1.4	9	20
5	0.0	0	0	6	.5	1	2

that implication. Statement 16 on Form A, "The Negro should have the advantage of all social benefits of the white man but be limited to his own race in the practice thereof," has a scale value of 7.7 and is interpreted by the author as expressing a liberal attitude toward the Negro. This statement was endorsed by 87 per cent of the experimental group and by 91 per cent of the control group. Statement 8 on Form B, "I believe that the Negro is entitled to the same social privileges as the white man," carries the same implication in regard to the social rights of the Negro with the exception that there is no proviso in this statement that he shall be limited to his own race in practicing them. This statement was endorsed by only 31 per cent of the experimental, and by 29 per cent of the control group. The subjects did not endorse the second statement because of their opposition to the social intermixture of the races. This interpretation is verified by the endorsements of the two statements numbered 15 on both forms of the scale. These statements are comparable in scale value and both express definitely the opinion that the Negro should be limited to his own race in the practice of social privileges. These



statements in both forms of the scale were endorsed by more than 80 per cent of both groups. One other comparison of statements shows the opposition of the group to the social intermixture of the races. Statement No. 4 in Form A, "The Negro should not be simply the doormat of American civilization," receives a scale value of 7.2 and expresses an attitude of simple justice for the Negro without any implication in regard to the intermixture of the races in order to make it possible. This opinion was endorsed by 84 per cent of the experimental group and by 94 per cent of the control group. The statement on Form B which is comparable in scale value to this one is No. 14, "There are some Negroes with whom I would esteem it a privilege to travel, but I would not spend an hour with a miscellaneous multitude of the Negro race." This statement may be interpreted to imply racial intermixture and was endorsed by only 41 per cent of the experimental and by 35 per cent of the control group.

There are then on Form A of the scale three statements with a liberal scale value that express an attitude in regard to equal social rights that are possible, or may be interpreted to be possible, without the social intermixture of the races. The statements on Form B of the scale that correspond to these three statements either in implication in regard to social rights or in scale value imply, or may be interpreted to imply, social intermixture of the races. The statements on Form A were endorsed by a large percentage of the students, but those on Form B were endorsed by a much smaller percentage. This tended to lower the average score made on the second form of the scale. This comparison of statements endorsed seems to indicate that the two forms of the scale are not comparable measures. This is further verified by the fact that 27 per cent of the students in the experimental group and 22 per cent in the control group made liberal scores on Form A of the scale, but only 11 per cent in the experimental and 9 per cent in the control group made liberal scores on Form B of the test. The result for the experimental group might be interpreted as due to the study of the race problem were it not for the fact that the result is the same for the subjects in the control group who did not study the problem.

The percentages of endorsement of the statements on Form B that express prejudice are considerably lower for the experimental group than for the control group. This seems to show that the study of

the Negro problem did have some effect on the attitudes of the experimental group towards the Negro. An analysis of the frequency of endorsement of the ten general questions given in Table 10 agrees

TABLE 10  
SHOWING THE PERCENTAGE OF SUBJECTS ENDORSING THE GENERAL STATEMENTS  
OF ATTITUDE TOWARDS THE NEGRO

Statement	Exp. group			Control group		
	Yes	No	?	Yes	No	?
1. Too much time spent on tests	0%	100%	0%	2%	98%	0%
2. Interested in study of problem	99	0	1	92	8	
3. Study of significance to American citizens	100	0	0	99	1	
4. Southern plan of separate schools should be continued	96	4	0	93	4	3
5. Separate sections on street cars should be continued	89	11	0	74	22	4
6. Equal educational opportunities for Negroes and white people	81	13	6	61	39	
7. Equal opportunities in business for Negroes and white people	59	38	3	44	53	3
8. Negro has ability to make a distinct contribution to American culture	83	13	4	79	18	3
9. Negroes have been exploited by Southern property owners	67	30	3	77	21	2
10. The Negro race problem should eventually be solved by amalgamation with other races	0	99	1	14	83	3

with this interpretation. Question 6, "Should the Negroes be given educational opportunities equal to those for white people?" is the same as statement No. 6 on Form A of the Attitude Scale. At the beginning of the experiment only 69 per cent of the experimental group endorsed the statement, but after studying the Negro problem 81 per cent endorsed it.

The attitude of the students towards equality of opportunity for economic achievement was not a problem of this study, but since the present educational status of the Negro in the South had to be interpreted in relation to his economic development two questions concerning this attitude were asked. Fifty-nine per cent of the experimental group and only 44 per cent of the control group favored giving the Negro the opportunity to compete in business on equal terms with the whites. The majority of students in both groups think that Negroes have been exploited by southern property owners.

The students in both the experimental and in the control group favor a continuation of the Southern plan of segregation of the races and practically all of them are opposed to racial amalgamation as a solution of the race problem.

The intercorrelations of the tests used are given in Table 11. The coefficients between the attitude scale and the Thurstone Psychological Examination are very low and unreliable. There is, however,

TABLE 11  
INTERCORRELATIONS BETWEEN THE ATTITUDE SCALE AND TESTS  
EXPERIMENTAL GROUP

Tests	1	2	3	4	5	6
1. Attitude A	...	.305 .073	.184 .078	.09 .08	.087 .08	...
2. Attitude B	.305 .073	...	...	.02 .08	.178 .078	...
3. Knowledge I	.184 .078	...	...	.415 .067	.468 .063	...
4. Knowledge II	.09 .08	.02 .08	.415 .067	...	.524 .059	.493 .61
5. Thurstone Intelligence	.087 .08	.178 .078	.468 .063	.524 .059	...	.612 .052
6. Final grades	...	...	...	.493 .061	.612 .052	...

TABLE 12  
INTERCORRELATIONS BETWEEN THE ATTITUDE SCALE AND THE TESTS FOR THE  
CONTROL GROUP

Tests	1	2	3
1. Attitude Scale A and B	...	.248 .07	.162 .073
2. Knowledge Test I and II	.248 .07	...	.573 .051
3. Thurstone Intelligence	.162 .073	.573 .051	...

a significant relation between the intelligence test and the scores made on the Knowledge Test. The coefficients between the attitude scale and the Knowledge Test are very low. These correlations seem to show that neither intelligence nor knowledge about the Negro has been an important factor in determining the attitudes of the subjects towards the Negro.

## VIII. SUMMARY AND CONCLUSIONS

1. More than 90 per cent of this group of southern students had never studied the Negro race problem in any course in high school or college, but the majority of them had known Negroes as servants in the home and as tenants and workmen. They do not have a feeling of antipathy or dislike for the Negroes whom they have known, as the sociologist would say, at this social distance.

2. The students of this group are neutral in their attitude towards the social rights of the Negro. At the conclusion of the experiment only two persons made scores that express prejudice against the Negro and these were both in the control group. They are, however, opposed to any change in the southern plan of segregation of the races and are practically all opposed to racial amalgamation as a solution of the race problem.

3. A comparison of the average scores made on the two forms of The Hinckley Attitude Scale and the Knowledge Test seems to show that the study of the problem of Negro Education in the South had no effect on the attitudes of the students towards the social rights of the Negro. But an analysis of the frequency of endorsement of the different statements suggests that for this group the scores made on Form B of the scale are not exactly comparable to those made on Form A. The group is opposed to any social intermixture of the races even in such secondary and tertiary social groups as school, economic, political, and religious organizations. There are more statements having a high scale value that imply equal social rights for the Negro without the necessity of social intermixture of the races in Form A of the Attitude Scale than in Form B.

4. The very low correlation coefficients between the Attitude Scale and the intelligence and knowledge tests show that neither intelligence nor knowledge of the social problems of the race has been an important factor in determining the attitudes of these students towards the social rights of the Negro. They seem to be determined by a cultural pattern of social organization which is accepted by the individual members in the group.

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## L'EFFET DE LA CONNAISSANCE SUR LES ATTITUDES À L'ÉGARD DU NÈGRE

(Résumé)

On a fait subir des formes comparables d'un Test des Connaissances à l'égard du nègre et l'Echelle de l'Attitude de Hinckley à un groupe expérimental de 70 étudiants universitaires du Sud des Etats-Unis avant et après une étude du problème de l'enseignement du nègre dans le Sud, et à un groupe de contrôle de 92 étudiants qui n'ont pas étudié le problème. Un questionnaire a montré qu'à peu près tous les membres des deux groupes avaient connu des nègres comme ouvriers et domestiques, mais que 90 pour cent d'entre eux n'avaient jamais étudié le problème du nègre comme membre d'une race.

Ni le groupe expérimental ni le groupe de contrôle n'ont eu l'attitude de préjugé contre le nègre. Il s'est montré un gain constant de la connaissance du nègre, mais nulle différence constante des attitudes à l'égard du nègre. Une analyse des déclarations spécifiques marquées semble

indiquer que les résultats ont été trop influencés par l'attitude spécifique de l'opposition à l'opinion que le mélange des races devrait résoudre le problème du nègre comme race, et donc n'indiquent pas d'une façon exacte les changements de l'attitude. Les attitudes à l'égard du nègre avant une étude spécifique du nègre ne semblent être déterminées ni par une connaissance du problème de la race nègre ni par l'intelligence mais par une forme culturelle de l'organisation sociale laquelle est acceptés par les membres individuels du groupe.

BOLTON

## DIE WIRKUNG GENAUERER KENNTNISSE AUF DIE ANSICHTEN ÜBER DEN NEGER

(Referat)

Vergleichbare Formen des Erkenntnistests über den Neger und die Hinckley-Skala von Ansichten bezüglich des Negers wurden einer experimentellen Gruppe von 70 südlichen Universitätsstudenten vor und nach dem Studium des Negerproblems im Süden der Vereinigten Staaten gegeben, und einer Kontrollgruppe von 92 Studenten, die das Problem nicht studiert haben. Ein Fragebogen zeigte, dass beinahe alle in den beiden Gruppen Neger als Arbeiter und Diener gekannt hatten, aber 90 Prozent hat das Negerproblem nie studiert.

Weder die experimentelle noch die Kontrollgruppe war gegen den Neger voreingenommen. Es zeigte sich ein zuverlässige Zunahme in den Kenntnissen über den Neger, aber keine zuverlässige Differenz in den Ansichten über den Neger. Eine Untersuchung der Spezifischen Angaben, die unterstrichen wurden, scheint anzudeuten, dass die Ergebnisse ungehörig durch die spezifische Ansicht des Widerwillens gegen den Standpunkt, dass das Negerproblem durch Rassenmischung gelöst werden sollte, beeinflusst worden sind, und folglich sehr ungenau die Veränderungen der Ansichten zeigen. Die Ansichten über den Neger vor einem bestimmten Studium des Negers scheinen weder durch die Kenntnisse des Negerproblems noch durch die Intelligenz bestimmt zu werden, sondern durch die Kulturgestaltung der sozialen Organisation, die von den Einzelmitgliedern angenommen wird.

BOLTON

# STUDY OF A GROUP OF PARIS CHILDREN: THEIR IDEAS OF RIGHT AND WRONG; THEIR REACTIONS IN SITUATIONS INVOLVING COOPERATION AND SELF-SACRIFICE\*

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MADALINE KINTER-REMMLEIN

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The idea of the research herein reported was suggested by the Character Education Inquiry at Teachers College. In that Inquiry the directors, Drs. Mark A. May and Hugh Hartshorne, experimented with several thousand children of both sexes, aged nine to thirteen years. Their physical health, their emotional stability, the social and economic rank of their parents, were ascertained as well as their scores on some thirty measures of conduct, moral knowledge, prejudices, attitudes, and opinions. Having discovered the individual differences in these respects, the Inquiry sought to determine their interrelationships and causes.

One of the most significant conclusions of the Inquiry was the specificity of character; that is, a child's conduct, good or bad, is not organized but is rather the result of particular experiences. Trait names were not found to have pragmatic meaning for the children examined, who acted in given situations in such manner as would best effect their desired results.

The aim of the Parisian study was to examine the moral knowledge and conduct of a representative group of French children, making comparisons with the American group to discover if the conclusions of the Inquiry hold true in a society so different and so much more homogeneous. Obviously the study could not be carried on in such great detail and the conclusions are therefore tentative only, but they show tendencies which may be interesting though not so conclusive.

In order to make a fair comparison of French and American children it was necessary to choose the two groups which are similar in such characteristics as age, intelligence, social and economic sta-

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tus, and level of education; allowing the moral knowledge and conduct scores to be the pertinent variables. If, by the process of elimination, an American group absolutely similar to the French in all these basic qualities be chosen, the American group would be too small to establish a conclusive comparison. It was necessary therefore to use an American group which closely resembled the Parisian group in the most important respects, thus making the comparison approximate. The American children taken for comparison are of both sexes, aged eleven years on the average, in the fifth grade of elementary public school, and of middle social and economic class.

On account of the difficulty in securing entry to the French schools, the group studied in Paris was small, but very homogeneous. There were 52 boys and 51 girls. The average age of the boys was 11 years 7 months, that of the girls 11 years 1½ months. This difference of six months in the average age of the sexes did not account for the differences between the sexes found throughout the results of the study. The average intelligence of the French boys, as measured by the Pintner's Non-Language Mental Test was 379.68 and that of the girls 239.61. This is a great difference, more than should be attributed to the difference in age. When the raw scores of this test were turned into Mental Indices, the average for the boys was 61 and for the girls, 48. The Mental Index for each age level is 50 according to the norms established by Dr. Pintner. This means that, with age held constant, the French boys were 11 points superior to the average American child and the girls, 2 points below. When the cases were considered individually, four girls showed such low Pintner scores as to be considered far below the normal French mentality; omission of these scores raised the girls' average to 51. This is normal for the Americans but is still below the average for the French boys. This sex difference was so marked that it took a place in the study much more important than originally planned.

On account of the very different economic and social make-up of the two countries it seemed unwise to attempt to apply any one of the several American measures of family status. Since occupation of parents had been proved a valid index to American cultural status, this alone was used in Paris to make a rough classification



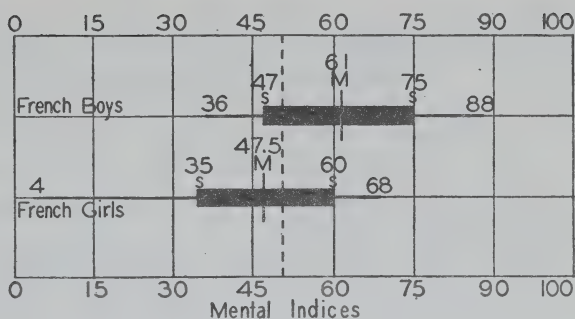


FIGURE 1

The above figure shows the means, sigmas, and also the highest and lowest mental indices of each group. The vertical dotted line represents 50, the American norm. 72% of the boys and 43% of the girls fall above this norm of 50. 78% of the boys fall above the average of the girls.

of the family rank. The occupations of parents were grouped as follows:

	Parents of boys	Parents of girls
Professions	9.5%	7.7%
Artisans	34.0	23.0
Skilled workers	34.0	46.0
Unskilled workers	29.5	18.0
Laborers	3.8	5.2

This classification of occupations is undoubtedly untrue to French life and any classification of family by occupations is impractical from the French point of view; nevertheless it afforded a means of comparing the children within their own group and no comparison was attempted with the same kind of American data except in the most general way. The purpose of the occupational classification was to determine if the sex differences found throughout the study could have been caused in part by a difference in home background. So far as the occupation is indicative, there is not much difference in the family status of the boys and girls in this group.

On the subject of comparison of degree of education in the two national groups, it was impossible to do anything definite. The classes chosen for the testing were as nearly as possible on the same level as the fifth-graders in America. Here again, however, a sex

difference was found among French boys and girls of this group. The average of school marks for the previous semester was obtained for each child. On the basis of 10, the average school mark of the boys was 7 and for the girls 6. This difference really has little to do with sex difference, since the girls and boys attend different schools; the girls are taught by women and the boys by men. There are so many factors entering into this difference that it is impossible to explain it by any one cause as sex.

Two attempts were made to secure an index to the behavior of the children on the basis of teachers' judgments. First the deportment mark was obtained for each child. The average for the boys was 9 (on the basis of 10) and for the girls, 7. The second behavior index was secured by a questionnaire to which the teachers replied for each child of their class. This questionnaire was used in the Character Education Inquiry. The average judgment given the boys by their masters was 5% above that given the girls by their schoolmistresses. This represents the judgment of the teacher on the pupil or the idea which the teacher has of how the pupil conducts himself and is referred to as teachers' ratings in this report.

In each case one sees that the boys are on the average higher than the girls. The causes could be diverse—the difference in age, the fact that the life of the boys is different from that of the girls and they thus have more experience. Perhaps the boys have the opportunity to develop themselves more than the girls; or perhaps they are more intelligent by birth. Perhaps the difference is caused by the fact that the boys are taught by men and the girls by women. Certainly the appreciation of their teachers is markedly different.

With this preliminary description of the French group in mind, the results of the study can be better interpreted. The data obtained for each child consist of intelligence level as revealed by the Pintner Non-Language Mental Test; the average of school marks for previous semester; the teacher's deportment mark; the teacher's ratings based on the questionnaire having to do with the manner of behavior of the child; an index of the stability of personality of the child as measured by Maller's Character Sketches; a measure of moral knowledge secured by the Character Education Inquiry Opin-

ion Ballot; and two actual behavior scores—cooperative efficiency and self-sacrifice—by the Maller Tests, Series C. The results of these tests will be described briefly below.

### CHARACTER SKETCHES

This test consists of 100 phrases, each describing the character of some unknown person, and the child indicates whether or not the description fits his own character also. It was translated as literally as possible without weakening its significance by the translation. It was discovered, however, that the vocabulary of the French children differed from that of the Americans of the same age. In Paris the children asked many questions concerning the meaning of words, especially abstractions.

The total score of the Character Sketches denotes emotional stability. In America there appeared no sex difference in the results of the test, but in Paris there was found a large difference in favor of the boys, who on the average are more stable and are at the same time 23% less variable than the girls. The French group considered as a whole is 8% more variable than the American group.

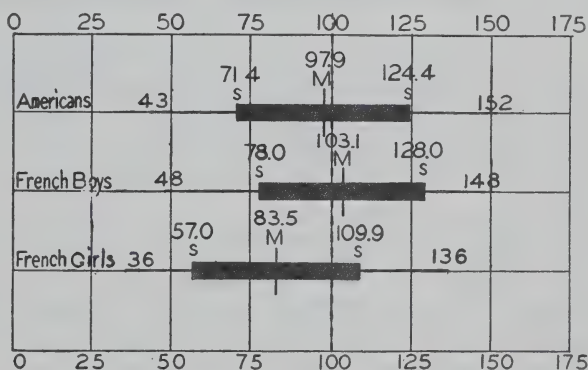


FIGURE 2

The above figure shows the means, sigmas and also the highest and lowest scores of each group. The vertical dotted line represents the theoretical norm. 77% of the French boys fall above the average of the girls. 55% of the French boys and 27% of the French girls fall above the average for the Americans.

The test Character Sketches is composed of six parts. The part scores show a consistent sex difference among the French children, although the group as a whole is not dissimilar to the American averages.

TABLE 1.

Parts of Character Sketches	Boys	French Girls	Total	American
Habits	26.3	22.9	24.6	23.0
Self-control	19.5	15.4	17.4	18.1
Social adjustment	21.2	17.5	19.8	19.6
Personal adjustment	28.4	22.2	25.3	25.2
Mental health	8.3	7.2	7.7	10.7
Tendency to confide	4.7	3.98	4.3	2.8
Total score	103.1	83.5	93.4	97.96

The personality differences between French and American children so far as can be discovered in this restricted study are better demonstrated by the results of an item analysis than by a comparison of average scores. A few of the more striking differences are listed below. The figures at the right give the percentage of French and American children who responded affirmatively to each statement, thus signifying that they considered the statement applicable to themselves as well as to the unknown person described in the statement.

Statement	French	American
Looks people straight in the eye when talking to them	68%	36%
Exaggerates and fusses about ordinary happenings	25	12
Finds work whether assigned or not	70	59
Cheerful and keeps temper even when things go wrong	57	78
Has no will power	40	29
Very impatient, can't wait for his turn	42	18
Can't keep a secret; must tell it to someone	28	12
Does not go to pieces in a contest	55	78
Easily swayed by what other people say, particularly if told in a strong and commanding manner	42	29
Depends upon other people in deciding on important things	43	28
Finds it difficult to get rid of a salesman, is easily talked into buying things	42	13
Becomes excited and wrought up before taking an examination and is unable to prepare for it because of excitement	42	25
Dislikes people who speak very slowly	65	36
Often wishes he were somebody else	22	10



Statement	French	American
Never has a feeling that things aren't real	24	53
Forgets unpleasant memories quickly	68	44
Feels more at ease with father than with mother	35	19
Worships the heroes he reads about in books	75	50

While some of these differences are large enough to be indicative of a real difference in the two groups, the interesting point in the comparison is the fact that the differences are not greater than they are; and in many items of the test the responses of the two groups were practically in the same proportion.

### OPINION BALLOT

The data in regard to the moral knowledge test are rather confusing because the French teachers objected to the last two parts of the test for use with the younger children. These parts have to do with the probability of consequences and their importance. Scores were given therefore to all the French children for the first four parts of the test; and complete scores to the older half of the French group. Since part scores were not available for the American children, no comparison was possible between the French and American groups except for 53 cases which completed the test in the Paris group. The first four parts of the moral knowledge test are related to duties, comprehension of morals, and knowledge of right and wrong. The boys have a better average score and are 28% less variable than the girls. Sixty-four per cent of the boys reach or surpass the average of the girls.

But when the complete test is considered the French girls excel the French boys and also greatly surpass the American children of both sexes. The boys are still less variable on the whole test as on the subtotal scores; and the French group as a whole is 11% less variable than the American group. The incomprehensible fact is that 90% of the French group reach or excel the American average, when the total scores only are considered. Since the French girls increase their scores so disproportionately by the last two parts of the test, it seems reasonable to conclude tentatively that they are able to predict better than the boys the probable consequences of their acts and their relative importance; although the boys know better than the girls the ethical procedure under given circumstances.

TABLE 2

	Mean		Sigma	
	French	American	French	American
Test incomplete:				
French boys	213.9		16	
French girls	209.3		22	
Test complete:				
Boys	283.2	269.	19	38
Girls	290.6	242.	23	46

## CONDUCT TESTS—COOPERATIVE EFFICIENCY

The measures of the willingness to cooperate and to sacrifice self-interest for group advantage were established on the scores of an easy arithmetic test. The test measures the difference in force of motives entering into competition and cooperation. The comparison between the amount of arithmetic work done for a class prize and that done for an individual prize gives the scores of cooperative efficiency.

A slight sex difference was found among the Paris children in the scores of cooperative efficiency, but this time it is in favor of

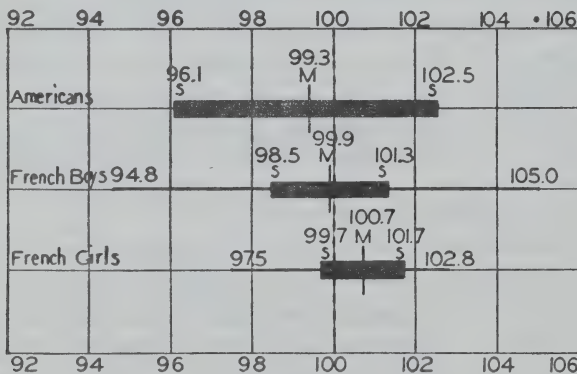


FIGURE 3

The above figure shows the means, sigmas and also the highest and lowest scores of each group. The vertical dotted line represents the division between the preponderance of class and individual work. 42% of the French boys and 71% of the French girls worked as much as or more for the class than for themselves; among the Americans 35% of the children worked as much as or more for the class than for themselves.

the girls. The test is so arranged that a score of 100 indicates that the subject has done exactly the same amount of work for both prizes, individual and class. If the score is below 100, more work has been done for self; if above 100, more work has been done for the class. Figure 3 shows that the girls are more willing to cooperate than the boys, but they are 28% more variable than the boys.

### CONDUCT TESTS—SELF-SACRIFICE

The last part of the same arithmetic test gives a score which measures the altruistic tendency of the subjects by offering seven opportunities for choice between working for the individual prize or for the class prize. The average for the American group was 2.5, representing the number of pages among seven which were donated toward the class prize at the sacrifice of individual credit. The French group obtained an average of 3.77, much higher than the American average. The French boys' average was 4.08 and that of the French girls, 3.46.

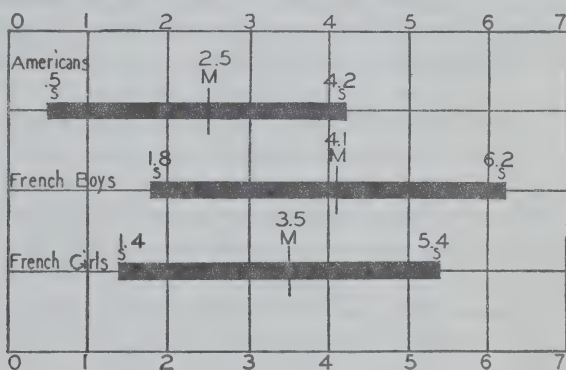


FIGURE 4

The above figure shows the means and sigmas of each group. The highest and lowest scores were respectively 0 and 7 in each group. 12% of the French boys and 21% of the French girls received zero scores indicating that no work at all was given toward the class prize. Among the Americans, 31% of the boys and 21% of the girls did not contribute to the class prize. In the Paris group, 16% of the boys and 6% of the girls gave all seven pages to the class, while among the Americans 12% of the boys and 6% of the girls showed this high degree of self-sacrifice.

Although a sex difference was found in both parts of this test, the direction of the difference was contradictory. The explanation of this fact might lie in the very slight difference in favor of the girls in regard to cooperative efficiency, wherein the difference is unreliably small. Furthermore, the girls probably cooperate better than the boys because they conform more voluntarily than the boys to the discipline of the school. When the children have the choice, the boys show greater self-sacrifice than the girls, but when cooperation is demanded the girls conform more than the boys.

The relative force of the two motives is even better demonstrated by Figure 5. At the beginning the children in Paris worked harder for the class prize, but at each successive page the self-interest gained force until in the fourth minute of work the same amount was done for class and for self; thereafter the selfish motive predominated and at the end of the test more work was done for self than for class. At the beginning the group averaged .96 addition more per minute for class than self; at the end, they averaged .81 addition per minute more for self than for class. Therefore, the force of the *esprit de corps* motive lost by 1.57 additions per minute. The effects of practice were the same for the two contests since the pages of the test were given alternatively to one and the other.

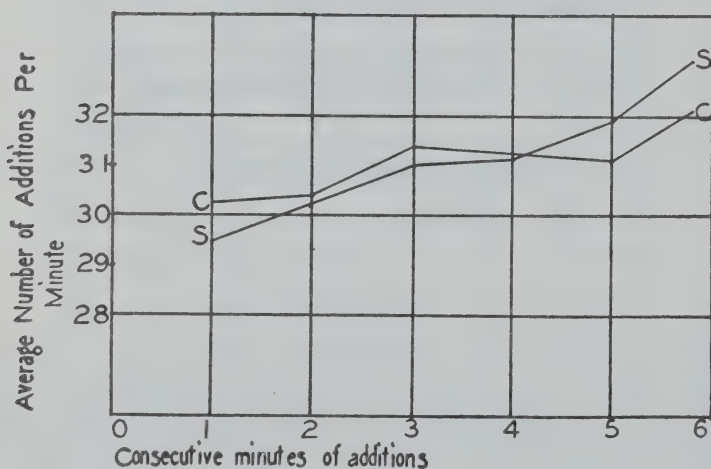


FIGURE 5



The test results above described lead to the following summary of the comparison between French and American children as well as the French sex difference. The French group showed an intelligence above the American norm, the French boys excelling the French girls. The French group demonstrated a less stable emotionality than the Americans, the French boys being more stable than the French girls. The older half of the French group surpassed the Americans in moral knowledge. Within their own group the French boys were able to judge the right from the wrong better than the girls; but the latter knew better than the boys the probability and the importance of the consequences of their acts. The French group was more cooperative than the American, the French girls excelling the French boys. The French group was more altruistic than the American, the French boys surpassing the French girls.

The interrelationships of the data are shown in Table 3. The correlations between the moral knowledge scores and the other data of the study show a fairly high relationship:  $r$  .52 between moral knowledge and stability of personality, which is higher than the correlation obtained between these two types of scores in America ( $r$  .31). One might expect to find a high degree of relationship between moral knowledge and school deportment marks ( $r$  .46) and between these deportment marks and the personality scores ( $r$  .52); but why the school marks should correlate so highly with moral knowledge ( $r$  .51) and with personality ( $r$  .44) is questionable. With intelligence held constant these correlations are lowered somewhat but are still high enough to suggest that the school marks have been to some extent given in consideration of the teacher's general impression as well as the pupil's educational achievement.

The low correlations between age and the scores of the study were such that age appeared to play little importance in the degree of moral knowledge and ethics of conduct. (When the scores of the various tests were correlated with age held constant, they were changed so slightly that it did not seem worth while to reproduce a table of such correlations.)

Attention should be called to the correlations between the teachers' ratings and the other data of the study. The high correlation between the teachers' ratings and school marks ( $r$  .56) adds evidence

TABLE 3\*

Intelligence	Age	School marks	Department marks	Teachers' ratings	Emotional stability	Moral knowledge	Cooperativeness	Self-sacrifice
Intelligence	.26	.48	.399	.19	.28	.42	-.15	.06
Age		.05	.11	-.13	-.07	.06	.006	-.09
School marks	-.08		.64	.56	.44	.51	-.08	.06
Department marks	.01	.55		.59	.52	.46	-.09	.04
Teachers' ratings	-.19	.55	.57		.53	.33	.005	.08
Emotional stability	-.15	.36	.46	.51		.52	-.12	.13
Moral knowledge	-.05	.39	.35	.28	.46		-.01	.05
Cooperativeness	-.05	-.003	-.03	.04	-.08	.08		-.02
Self-sacrifice	-.11	.032	.02	.07	.13	.14	-.01	

The lower half of the table indicates the correlations with intelligence held constant.

\*The P.E.'s range from  $\pm .043$  to  $\pm .0798$ ; all  $r$ 's above .21 are statistically reliable.

TABLE 4

Character Sketches	Age	School marks	Department marks	Teachers' ratings	Intelligence	Moral knowledge	Cooperativeness	Self-sacrifice
Part scores								
1. Habits	-.08	.39	.74	.50	.24	.58	.002	.09
2. Self-control	.002	.32	.26	.28	.21	.37	.05	.09
3. Social adjustment	-.02	.29	.42	.51	.17	.28	.02	.02
4. Personal adjustment	-.33	.31	.48	.64	.29	.55	-.09	.18
5. Mental health	.19	.22	.38	.34	.15	.35	-.13	.16
6. Readiness to confide						.23		
Total score	-.07	.44	.52	.53	.28	.52	-.12	.13

to the suggestion that the teachers have given school marks based on general impression more than on educational achievement of the pupils. The validity of the teachers' ratings is corroborated by the correlation between them and the deportment marks ( $r$  .59). Further evidence of the validity of the teachers' ratings and the Character Sketches as psychological instruments is indicated by the correlation ( $r$  .53) between these two sets of scores.

The relationship between the Character Sketches and other data is more interesting when viewed in the light of the correlations between the various part scores of the Character Sketches and such scores as the teachers' ratings, opinion ballot, and deportment marks. Table 4 gives a correlation of  $r$  .74 between habits and deportment marks;  $r$  .58 between habits and moral knowledge;  $r$  .51 between personal adjustments and teachers' ratings. These correlations suggest that part scores of the Character Sketches are as valuable in diagnosis as the total scores, or more so.

The aims of the Paris study were to make a comparison between the French and American children, as has been described, and also to discover if the relationship between moral knowledge and conduct found by the Character Education Inquiry exists also in Paris among a group with different cultural background, training, ideals, and inheritance. The heterogeneity of the American background has been suggested as one cause for the lack of relationship between conduct traits in the American children studied. The French group examined was exceedingly homogeneous. Not only the same national and cultural inheritance but also the similar school and family background made these children as homogeneous as the Americans are heterogeneous. The statistical interrelationships among the test scores should be higher in a heterogeneous group, if heterogeneity be an important factor.

Unfortunately, not enough data were obtainable in Paris to settle this question but the correlation between moral knowledge and the two conduct scores, and between the two conduct scores themselves, showed such a complete lack of relationship as to warrant the statement of a tendency in the direction of the same specificity of character as was found in America. In every case in which parallel evidence was secured, the French correlations are as low as or lower than their respective American correlations. The correlation between

moral knowledge and cooperative efficiency was  $r = .0127$  and with scores of self-sacrifice  $r = .053$ . The correlation between these two conduct scores was  $r = .067$ . These figures are very nearly the same as those found in the Character Education Inquiry with the American group, and their relationship to the other data of the study appears to be equally low, as will be seen from Table 3.

The integration of character depends on the individual's ability to retain experiences in view of a similar response in similar situations. If a child mentally classifies his experiences by the consequences of his acts, in consideration of traditions, principles, ideals, etc., he will have established an organization which will give to his future behavior a logical sequence—good or bad. Then one could predict his conduct in given situations by reason of his past conduct. He would be egoistic or altruistic. But the evidence to date indicates that there is no such organization of character. A child may be altruistic in one set of circumstances and egoistic under other conditions. His conduct depends on the circumstances and his past experience in like situations. The Paris study found no relationship between cooperativeness and self-sacrifice, just as the Character Education Inquiry found no relationship between honesty, willingness to serve, and self-control. The Paris study, although restricted in scope, found the same lack of relationship between knowledge of moral principles and conduct. Yet the Paris schools give strenuous training in morals—they have considered this subject in the curriculum along with arithmetic, geography, and history. The effects of this training of morals cannot be factored out because of the many incidental variables, but practical experience has led the Paris school system to the decision to abandon hereafter this formal moral education—that in itself seems to favor the conclusion of both these studies of character education.

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# UNE ÉTUDE DE QUELQUES ENFANTS DE PARIS; LEURS IDÉES DU BIEN ET DU MAL; LEUR COMPORTEMENT DANS DES SITUATIONS OU IL S'AGIT DE LA COOPÉRATION ET DE L'ABNÉGNATION

(Résumé)

On a essayé d'examiner les connaissances morales et le comportement d'un groupe d'enfants français, petit mais représentatif, en faisant des comparaisons avec un groupe semblable d'Américains. Le groupe français, composé de 52 garçons et de 51 filles, avait l'âge moyen de 11 ans, 4 mois. A l'égard de l'intelligence, mesurée par le Test Mental non-linguistique de Pintner, les enfants français ont été un peu supérieurs aux normes américaines mais les garçons français ont été très supérieurs aux filles françaises. Les données ont compris les notes scolaires moyennes, la note moyenne du comportement, l'estimation des maîtres selon l'Enregistrement du Comportement C. E. I., les résultats des connaissances morales, la stabilité émotionnelle, la disposition à coopérer, et l'altruisme.

Les membres du groupe français ont été moins stables émotionnellement, plus disposés à la coopération et plus altruistes que les Américains. La moitié aînée du groupe français a été supérieure aux Américains à l'égard des connaissances morales. Les garçons français ont été plus stables émotionnellement, un peu moins coopératifs, et plus altruistes que les filles françaises.

Les intercorrélations des données montrent une relation assez élevée entre les connaissances morales et la stabilité; une relation peu élevée entre la disposition à coopérer et la tendance à l'abnégation; aussi entre ces deux résultats du comportement et tous les autres résultats de l'étude, ce qui offre des témoignages à l'égard du principe de la spécificité du caractère.

L'étude à Paris, bien que limitée, a montré une différence définie entre les sexes non observée chez les enfants américains, tandis que des témoignages basés sur le groupe entier ont indiqué le même degré peu élevé de l'intégration morale trouvé dans les études du caractère américain.

KINTER-REMMLEIN

## EIN STUDIUM ÜBER PARISER KINDER; IHRE IDEEN VON RECHT UND UNRECHT; IHR VERHALTEN IN SITUATIONEN, DIE MIT WIRKUNG UND SELBSTOPFERUNG VERLANGEN

(Referat)

Der Versuch wurde gemacht, die sittlichen Kenntnisse und das sittliche Verhalten einer kleinen, aber typischen Gruppe von französischen Kindern zu untersuchen und mit einer ähnlichen Gruppe von Amerikanern zu vergleichen. Die französische Gruppe (52 Knaben und 51 Mädchen) waren im Durchschnittsalter von 11 Jahren 4 Monaten. An Intelligenz nach dem Pintner-Nichtverbaltest waren die französischen Kinder den amerikanischen Normen etwas überlegen; aber die französischen Knaben waren den französischen Mädchen sehr überlegen. Die Ergebnisse umfassen die Durchschnittszensuren, Durchschnittsverhalten, Beurteilung des Lehrers nach der C. E. I. Verhaltensregister, Werte für sittliche Kenntnisse, emotionale Beständigkeit, Bereitwilligkeit zur Mitwirkung, und Altruismus.

Die französische Gruppe war emotional weniger beständig, mitwirkender und altruistischer als die Amerikaner. Die ältere Hälfte der französischen Gruppe waren den Amerikanern an sittlichen Kenntnissen überlegen. Die französischen Knaben waren emotional beständiger, etwas weniger mitwirkend, und altruistischer als die französischen Mädchen.

Die Zwischenkorrelationen der Angaben zeigen ein ziemlich hohes Verhältnis zwischen sittlichen Kenntnissen und Beständigkeit; ein niedriges Verhältnis zwischen Bereitwilligkeit zur Mitwirkung und der Neigung zur Selbstopferung; auch zwischen diesen beiden Verhaltenswerten und allen anderen Werten in diesem Studium, die den Grundsatz der Spezifität des Charakters bestätigen.

Das Pariser Studium, obwohl beschränkt, beweist einen bestimmten Geschlechtsunterschied, der nicht unter den amerikanischen Kindern beobachtet wurde; die Ergebnisse der ganzen Gruppe weisen denselben niedrigen Grad der sittlichen Vervollständigung auf, wie es bei den amerikanischen Charakterstudien gefunden wurde.

KINTER-REMMLEIN

# SHORT ARTICLES AND NOTES

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## THE ETHICAL KNOWLEDGE OF DELINQUENT AND NON-DELINQUENT BOYS

GEORGE E. HILL

In the Illinois State Reformatory at Pontiac are nearly 3000 young men, wards of the state because convicted of crimes. Are these youths there because they lack moral knowledge or insight into what constitutes proper social behavior? Do they know and understand the code of conduct acceptable to society; or is ignorance of these things a factor in their perverse behavior?

To throw light on this question the writer applied a test meant to measure knowledge and understanding of the social code to 517 offenders at the Illinois State Reformatory.<sup>1</sup> These young men ranged in age from 16 to 26 years with a median age of 19 years 4 months. Most of them had been committed for acquisitive offenses—robbery, burglary, and larceny. Their Average intelligence, as measured by the Army Alpha Test, was well above that of the average native-born white draft. In school achievement they had passed the 7th grade, on the average, before being committed to the reformatory.

### THE TEST USED

A modified form of a "code" test originally devised by Betts (1) was administered. As used by Betts this test consisted of 50 brief descriptions of social situations and acts selected by the author to represent a fair sample of various types of behavior commonly considered to have social significance. The respondent was to rate each act anywhere from 1 to 10, from "not at all wrong" to the "worst wrong possible."

For the present investigation the number of items was increased to 70 by the addition of 14 acts describing typical delinquent and criminal offenses for which boys were most commonly sent to the reformatory and six other acts devised by the writer. The items starred in Table 1 are those describing typical offenses. The directions of Betts's test were lengthened and simplified. Most important of the changes made in Betts's test, the method of rating the acts was changed from a scoring devise ten units in length to a five-point rating scale. Each act is rated as "worst wrong possible," "very wrong," "quite wrong," "slightly wrong," or "not at all wrong."

As administered for this study the responses were anonymous. However, experience administering the form when names were asked leads the writer to believe that this was an unnecessary precaution.

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<sup>1</sup>This study was made possible through the cooperation of the Illinois Department of Public Welfare and the Institute for Juvenile Research.

If an individual were to rate each item on the test in accordance with his settled convictions, the convictions by which he guides his actual conduct, the test might be regarded as an attitudes test. However, it is probably safer to expect people to rate the acts in accordance with what they believe society expects of them, which may or may not represent their true attitudes.

No formal attempt has been made to validate this test of ethical knowledge. The test was called "What is Your Code?" implying that it measures knowledge of socially acceptable conduct. As a first step toward validation the acts included should be examined to determine how adequately they sample the varied types of problems of social relationships. Scores on the code form should be correlated with intelligence, reading ability, and scores on recognized social attitudes tests. Such methods of validation have been employed by Grafton (2) with his code test. The writer does not suggest that Grafton's validation will serve as a substitute for validating the "What is Your Code?" form. His findings, however, should be suggestive since the techniques used by the two code tests are very similar. Scores on the Grafton code test for junior high school pupils correlated with other measures as follows:

$r$ (Code with mental age)	+ .237
$r$ (Code with reading ability)	+ .186
$r$ (Code with behavior ratings)	+ .270
$r$ (Code with cheating test)	+ .018
$r$ (Code with attitudes test)	+ .095

While none of these coefficients is significantly high, the fact that the test correlated highest with behavior ratings and lowest with cheating is suggestive of a fairly high degree of relationship between ethical knowledge and general conduct as rated by teachers but of no relationship with the specific form of behavior tested by the cheating device. The fact that the ethical knowledge or code test does not measure the same thing as the attitudes test is significant from the standpoint of validation.

A fair degree of reliability for the "What is Your Code?" form was revealed when the average ratings of 241 undergraduate university students tested and re-tested one week later were correlated. The coefficient of correlation between these ratings was +.8277 P.E. .0190. This reliability coefficient should be regarded as but a rough indication of the test's consistency since it is based on the average "wrongness" of all 70 test items and not on individual item analysis.

#### THE GROUPS TESTED

The group of 517 delinquent boys tested at the reformatory has already been described. In addition the code test was administered to three control groups: 416 junior and senior boys in a suburban high school in a community highly favored economically, 604 high schools boys in a small



mining city in southern Illinois, and 148 graduate, undergraduate, and evening school students and men's Bible class members.

Unfortunately the items on the code form that deal with sex problems had to be eliminated when the form was administered to high school students and other items substituted. These were six in number, the items listed at the end of Table 1.

TABLE 1

RANKING OF CODE ITEMS BY OFFENDERS, HIGH SCHOOL BOYS, AND ADULTS

Code items	517 offenders	Ranking by		148 adults
		416 H. S. boys	604 H. S. boys	
Divorce when there are no children	1	2	2	1
Killing in self-defense	2	1	1	3
Free father who killed daughter's attacker	3	18.5	17	6
Betting on horse races	4	3	5	4.5
Living on inheritance, no service	5	12	11	19
Quitting school to go to work	6	4	3	8
Charging unfair interest	7	32	33	25
Girls smoking cigarettes	8	16.5	38	4.5
Not troubling to vote	9	26	10	20
Buying bootleg liquor	10	25	25	18
Lying about child's age on train	11	11	12	17
Woman having sex relations, un- married	12			36
Man having sex relations, unmarried	13			30.5
Not supporting religion when able	14	18.5	29	13
Refusing to bear arms in unjust war	15	7	8	2
Keeping over-change	16	31	21	28
Bootlegging liquor	17	36	35	22
Not giving to charity when able	18	30	18	23
Living beyond one's means	19	27	15	29
Skipping school for ball game	20.5	15	16	10
Using profane language	20.5	13.5	26	15
Underselling a competitor	22	20	13	24
Not attending church on Sunday	23	10	22	11
Driving when drunk with no accident	24	49	41	37
Often failing to keep promises	25	34.5	23	34
Boy quitting school	26	29	19	14
Married people using birth control	28			7
Committing suicide	28	21.5	24	27
*Grabbing fruit from store stand	28	39.5	30	35
Untruthful advertisement of medicine	30	38	47	46.5
Allowing deformed baby to die	31	9	36	9
Boy not studying in school	32	23	14	12
Copying on an examination	33	39.5	31	32.5
Cheating in grading paper	34	37	37	32.5
Causing trouble to irk teacher	35	28	28	26
Not paying taxes when able	36	45	42	39

TABLE 1 (continued)

Code items	517 offenders	Ranking by		148 adults
		416 H. S. boys	604 H. S. boys	
Falsifying income tax report	37	41.5	43	30.5
Stuffing the ballot box	38	43	45	40
Being cross and disagreeable to family	39	34.5	32	38
Not believing in God	40.5	24	65	16
Illicit sex relations, married	40.5			63.5
*Receiving stolen property	42.5	44	51	42
Not marrying girls lower in caste	42.5	33	39	21
Papers playing up crime news	44	52	57	60
Industry paying low wages	45	41.5	34	51.5
Selling one's vote	46	48	40	41
*Misrepresenting an investment	48	51	48	49
Legislator accepting bribe	48	56	53	59
*Destroying property just for fun	48	46	52	43.5
*Stealing a parked automobile	50.5	65	61	61
*Breaking into garage and stealing car	50.5	60	59	54.5
Setting fire to building for insurance	52.5	54	60	45
Bad working conditions in industry	52.5	56	46	56.5
*Breaking into flat stealing jewelry	54.5	66	64	62
Fouling player in a game	54.5	47	55	43.5
Nation dealing unjustly with another	56	50	54	58
*Breaking into store and stealing	57	61	62	56.5
*Shooting man during a hold-up	58.5	68	67	66
*Forging a check	58.5	63	56	63.5
*Acting as look-out for burglary, robbery	60	53	44	49
Poison gas in war on non-combatants	61	58.5	50	65
Breaking quarantine	63	56	58	49
*Sticking up an oil station	63	64	63	54.5
*Holding up and robbing a person	63	62	66	53
Falsifying under oath	65	67	69	46.5
Deserting a girl in trouble	66			67
*Man committing rape	67			70
Hit-and-run driving	68	69	68	68
Squealing on a friend	69	58.5	49	51.5
Kidnapping child for ransom	70	70	70	69
High school boy smoking cigarettes		5	7	
Keeping one's locker dirty		6	9	
Snubbing a fellow-student		8	6	
Making unnecessary noise in assembly		13.5	20	
Taking book from library on the sly		16.5	4	
Booing officials at a game		21.5	27	

## METHOD OF SCORING THE TEST

Tabulations were made of the number of times each of the 70 items was rated in each of the five columns of possible ratings. For each item an average wrongness score was determined by weighting these ratings

1, 2, 3, 4, and 5 from "worst wrong possible" to "not at all wrong," and by dividing the total weighted ratings by the number of respondents who check the item. In this way each item was given a score. For instance, one item was rated by the adult group on the average 1.9 or about "very wrong." This sort of weighted average rating was determined for each of the 70 items for each of the four groups tested.

On the basis of these weighted ratings the 70 items were ranked from 1 to 70, that is from least wrong to most wrong. It was then possible to compare the rankings of items by the four groups and to obtain rank-difference coefficients of correlation of the relative ratings of the four groups.

#### ETHICAL KNOWLEDGE OF DELINQUENTS AND NON-DELINQUENTS

In Table 1 are listed the 70 acts with brief, and in most cases abbreviated, descriptions and with the rankings of the acts for the four groups. A rank of 1 means that the act was rated as least wrong of the 70; a rank of 70 indicates the item ranked as most wrong. The starred items are those typical of offenses for which boys were sentenced to the reformatory.

It will be remembered that the 416 high school boys came from a suburban high school, the 604 high school boys from a mining town high school.

Rank difference coefficients of correlation between the rankings of the various groups were:

Rho (Offenders with 416 high school boys)	+.8676	P.E.	.0205
Rho (Offenders with 604 high school boys)	+.8663	P.E.	.0218
Rho (Offenders with 148 adults)	+.8498	P.E.	.0218
Rho (416 high school boys with 604 high school boys)	+.9004	P.E.	.0145
Rho (416 high school boys with 148 adults)	+.9217	P.E.	.0120
Rho (604 high school boys with 148 adults)	+.8158	P.E.	.0292

The general ranking of the code items did not vary much from group to group. For instance, there was greater general agreement between offenders and adults than between the 604 mining town high school boys and adults. Such correlations, however, hide significant differences between the rankings of individual items.

An item by item analysis of differences would be impossible within a reasonable space. Therefore, particular attention will be paid to differences between offenders and the other groups that are fairly marked. As a rather arbitrary standard of difference, comparisons will be made of those items ranked ten or more points higher or lower in the scale of 70 items by the delinquents as compared with the other groups. First are listed three groups of items ranked 10 or more points *less wrong* by the offenders than by the other three groups.

Items ranked 10 or more points *less wrong* by offenders than by 416 suburban high school boys were:

- Very often failing to keep promises
- Jury freeing father for killing his daughter's attacker
- Bootlegging liquor
- Buying bootleg liquor
- Driving an auto while drunk
- Not giving to charity when able
- Not troubling to vote
- Keeping over-change given by a clerk
- Charging interest above a fair rate
- Shooting a man during a hold-up because he resists
- \*Breaking into a flat and stealing money and jewelry
- \*Stealing an auto parked in the street
- \*Breaking into a garage and stealing a car
- \*Grabbing fruit off stand in a store

The last four starred items are typical reformatory offenses.

The items ranked 10 or more points *less wrong* by the offenders than by 604 mining town high school boys were:

- Girls smoking cigarettes
- Doctor allowing a badly deformed baby to die
- Jury freeing father for killing his daughter's attacker
- Bootlegging liquor
- Buying bootleg liquor
- Driving an auto while drunk
- Prosperous industry paying workers wages below reasonable level
- Not giving to support religion when able
- Charging interest above a fair rate
- Advertising medicine known to be worthless
- Newspapers treating crime news so as to make hoodlums and gangsters appear like heroes
- Not believing in God
- Fouling an opponent during a game
- \*Breaking into a flat and stealing money and jewelry
- \*Stealing an auto parked in the street
- \*Breaking into a garage and stealing a car
- \*Grabbing fruit off stand in a store

The items ranked 10 or more points *less wrong* by the offenders than by 148 adults were:

- A man having sex relations while unmarried
- Having illicit sex relations after marriage
- Woman having sex relations while unmarried
- Legislator accepting a bribe
- Driving an auto while drunk
- Not troubling to vote
- Keeping over-change given by a clerk
- Charging interest above a fair rate
- Living on inherited wealth without rendering service



Advertising medicine known to be worthless  
 Newspapers treating crime news so as to make hoodlums and  
 gangsters appear like heroes  
 \*Stealing an auto parked in the street

Turning now to the items regarded as 10 or more points *more wrong* by offenders as compared with the other three groups, the following were more severely condemned by the delinquent boys than by the 416 suburban high school boys:

Doctor allowing a badly deformed baby to die  
 Not believing in God  
 Man not marrying a girl because of social caste  
 Squealing on a friend to keep out of trouble  
 Not going to church on Sunday when able

The items considered 10 or more points *more wrong* by the offenders than by the 604 mining town high school boys were:

A nation dealing unjustly with a smaller nation  
 Boy not studying in school because he doesn't like it  
 Nations at war using poison gas on non-combatants  
 Squealing on a friend to keep out of trouble

The items regarded as *more wrong* by offenders than by adults were:

Skiping school to go to a ball game  
 Boy quitting school because he doesn't like it  
 Boy not studying in school because he doesn't like it  
 Boy causing trouble in school because he doesn't like teacher  
 Testifying falsely in court under oath  
 Doctor allowing a badly deformed baby to die  
 Married persons using devices for birth control  
 Refusing to bear arms in an unjust war  
 Breaking quarantine  
 Not believing in God  
 Not going to church on Sunday when able  
 Man not marrying a girl because of social caste  
 Squealing on a friend to keep out of trouble  
 Fouling an opponent during a game  
 \*Holding up and robbing a person  
 \*Acting as look-out man in a burglary or robbery

#### CONCLUSIONS

It is probably unsafe to draw general conclusions from these rather confusing results. It would appear, however, that delinquents were more liberal than the control groups in respect to liquor law violations and toward violations of the moral code on sex irregularities. The most conservative group on the religious items was the group of mining town high school boys; the delinquent boys were next most conservative religiously. Aside from these two generalizations it is impossible to point

to any clear-cut trends in the responses on the test of ethical knowledge. In many respects the adults were the most liberal of all groups. In other respects, particularly as regards acts having broad social significance, they were most severe.

It may be of some significance that the high school boys and to a degree the adults regarded four forms of burglary and larceny as much more serious than did the delinquent boys. On the other hand, adults were less severe than offenders toward two common crimes. So far as this test will reveal, the offenders seem to be particularly anxious to be loyal to their friends; "squealing" is second only to kidnapping in its heinousness.

When one sums up the comparisons he is confused by conflicting evidences. *First*, there seems to be a high degree of general agreement between the ethical knowledge, as here measured, of offenders and non-offenders. *Second*, there are significant acts which offenders regard more lightly than do non-offenders. *Third*, there are equally significant acts regarded much more liberally by non-offenders, particularly adults, than by delinquent boys. *Fourth*, there are relatively few items of ethical knowledge in this inventory which will distinguish inevitably between delinquents and non-delinquents. *Fifth*, an adult standard of conduct or social code would seem to be a more liberal standard than that set by young men.

It is possible that with some more refined method of scoring the code form and possibly with changes in some items, a test of ethical knowledge might be evolved that would yield reliable distinctions between offenders and non-offenders. It should be remembered also that the scoring method here used considers relative values, comparisons of one act with another, and not absolute values. A more rigid scoring system might yield different results.

It is the writer's judgment that the offenders of this study were too old to differ markedly from non-offenders in their judgment of what society expects of them. They have had too much contact with social demands to be ignorant or even partially unaware of social requirements. While they still seem to think some definitely anti-social acts are not very wrong, on the whole their knowledge of right and wrong would not seem to be deficient enough to account to any significant degree for their misconduct.

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THE INFLUENCE OF INDIVIDUAL ATTITUDES ON CONSTRUCTION OF AN ATTITUDE SCALE<sup>1</sup>

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An assumption once made by Thurstone (6), namely, that the scale values of the statements of an attitude scale are independent of the attitudes of the raters has, so far as the writer is aware, been subjected to only two experimental tests. One was made by Hinckley (4), and the other by Beyle (1). Hinckley secured three groups of judges who differed markedly in their attitudes toward the degree of social privilege which should be accorded the Negro. He had each group sort a number of sentences concerning the Negro, and, on the basis of the responses of each group, constructed scale values of the statements. He then computed correlations between the various sets of scale values. These correlations ranged between  $+.94$  and  $+.98$ . Beyle secured two groups of judges who differed markedly in their attitudes toward Al Smith, and, on the basis of their assortment of statements concerning him, constructed two sets of scale values between which the correlation was near unity.

As has already been indicated, in order to attempt validation of the above postulate all that must be done is to construct scale values of statements concerning a particular attitude variable based upon the responses of judges differing markedly in their attitudes. If the different sets of scale values are nearly the same it would indicate that there is no relationship between the attitudes of the raters and the scale values of the statements. On the other hand, if the resultant sets of scale values are different, it would indicate some such relationship.

The attitude variable which the writer chose for the present experiment was that toward war. By means of Ruth C. Peterson's Scale (5) for the Measurement of Attitude toward War (form A), three groups of judges differing markedly in their attitudes toward war were secured. The judges were secured from students in attendance at Stanford University, San Jose State Teachers' College, and the University of California, and from members of the Epworth Leagues of the First Methodist Church in San Jose, and the Trinity Methodist Church in Berkeley. Altogether there were secured one hundred judges who could be used in the present study. From this number of judges three groups were formed which may be designated as groups A, B, and C.

Group A consisted of twenty-five judges strongly opposed to war, as was indicated by the mean score on the criterion scale of  $2.6 \pm .0$ . The members of group B (fifty in number) were moderately opposed to war as was indicated by the mean score of  $3.6 \pm .1$ . Group C (twenty-five judges) had a mean score of  $5.2 \pm .1$ , which indicated according to the criterion scale a neutral attitude. The sigmas of the groups were .2, .8,

<sup>1</sup>Reported in part at the 1933 meeting of the Western Psychological Association.

and 1.0 respectively. It is to be regretted that groups moderately and strongly favorable toward war could not have also been secured, but throughout the entire period of experimentation it did not seem possible to secure such groups. The three groups that were secured, however, differed so significantly in their attitudes toward war that if any relationship existed between the attitudes of the judges and the scale values of the statements it would surely have appeared in these three groups. The differences between the mean scores of these groups were as follows: between groups A and B,  $1.0 \pm .1$ ; between groups B and C,  $1.6 \pm .1$ ; between groups A and C,  $2.6 \pm .1$ . The D/PE (diff)'s were 10.0, 16.0, and 26.0 respectively, all much higher than were necessary in order to indicate significance.

To the judges in each of these groups was given in paired comparison form a list of statements concerning war. The statements were those which constitute form B of Peterson's Scale for the Measurement of Attitude toward War. As there are twenty statements in this scale and each was paired with every other the judges had 190 pairs of statements to judge. The statements appeared approximately in a random order and were distributed as uniformly as possible throughout the test blank. The subjects were instructed to indicate which statement in each pair was the more favorable toward the conduct of war.

On the basis of the responses of the judges in the three groups three different sets of scale values were constructed. The values were computed both according to Thurstone's paired comparison method (7) and Guilford's short cut method (3). Correlations were then computed between the various sets of scale values. When Thurstone's method was employed these correlations were: between groups A and B,  $+ .993 \pm .002$ ; between groups B and C,  $+ .991 \pm .003$ ; between groups A and C,  $+ .984 \pm .005$ . These correlations became  $+ .982 \pm .005$ ,  $+ .977 \pm .007$ , and  $+ .991 \pm .003$  when the scale values were computed according to Guilford's short cut method.

One objection which might possibly be raised against these results is that reliable results might not be possible of attainment with so few judges in each group. As a check upon this, correlations were computed between each set of scale values derived in this experiment and the published scale values which were derived by the method of equal appearing intervals. The correlations between the scale values (computed according to Thurstone's paired comparison technique) based on the responses of the three groups, and the published scale values (computed according to the method of equal appearing intervals) were  $+ .974 \pm .008$ ,  $+ .973 \pm .008$ , and  $+ .974 \pm .008$  for groups A, B, and C respectively. These correlations became  $+ .972 \pm .008$ ,  $+ .955 \pm .013$ , and  $+ .972 \pm .008$ , respectively, for the three groups when the scale values based on their responses were computed according to Guilford's short-cut method. It seems to the writer that these



correlations indicate that the number of cases was not too small to yield reliable results.

In view of the foregoing, the writer concludes (2) that at least for the attitude variable under consideration he has confirmed the assumption of Thurstone that the scale values of the statements in an attitude scale are independent of the attitudes of the judges who are selected to sort the statements which are to make up the scale.

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#### THE CASE OF "B"—A GIFTED NEGRO GIRL

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The intelligence test, containing a composite of tasks selected from the experiences of children, presupposes that the elements shall represent "constant" or common factors in the life activities of every child to be tested. If this condition were fulfilled the test might indirectly reveal differences traceable to inherited nature or to biological determiners. However, many critics have pointed out that the present stock of intelligence tests fails even to approximate this essential condition, and that, therefore, comparisons of groups having different backgrounds are spurious and futile. Particularly invidious have "race" comparisons proven, since tests have never sampled adequately common "functions" from the life experiences of the children in the different "racial" groups. This criticism is especially applicable to those studies which have compared Negro and white children, since these two groups are sharply differentiated in social status, in edu-

cational opportunity, and in cultural background. Furthermore, to some, it has seemed that the present array of tests is of questionable validity for establishing differences and for making comparisons within the Negro group because tests include items "weighted" in terms of the experiences of white children. In the studies reported to date, Negro children usually have been found distinctly inferior to white children in test-intelligence, and few Negro children have been cited who earn scores in the "genius" or "near-genius" category. Although L. M. Terman reported 15 children of IQ 180 or above, and L. S. Hollingworth wrote about 17 children who tested at or above IQ 180, there has not appeared, in so far as the writers know, a published account of a Negro child testing at these extraordinary levels. Some have felt that this condition may be attributed to the inadequacy of the Stanford-Binet test in sampling validly the experiences of Negro children, and others have assailed sharply the validity of this test as a measure of Negro children.

Nevertheless, the writers of this paper have found the Stanford-Binet test useful in examining capable Negro children, and in identifying those of unusual ability. A Negro child, who undoubtedly is one of the most precocious and promising children in America, has been discovered recently by the writers during a systematic search for gifted Negro children in the elementary schools of Chicago. This girl, "B," at 9 years, 4 months of age, earned a Stanford-Binet IQ of 200.

#### MENTAL TEST RECORDS

On the Stanford-Binet, "B" achieved a mental age of 18 years, 8 months (corrected score) (1, p. 43), with a resultant IQ of 200. The uncorrected MA and IQ are 17-5 and 187, respectively.

B's performance on the test reveals qualitative as well as quantitative superiority. Her responses were in general very rapid. On the dissected sentences (XII-4), for which one minute is allowed for each of the three, her responses were made in 10, 7, and 9 seconds. The arithmetical reasoning tests (XIV-5), in which one minute is allotted for each problem, required only 25, 15, and 13 seconds, respectively. And in the vocabulary test the definitions were given rapidly and without hesitation. The quickness of the response was not the only significant mark of B's performance. Richness in associations and originality in recall appeared throughout. Nowhere were these qualities more conspicuous than in the vocabulary test, upon which B achieved a score equal to the norm for year XVI. The quality of response is exemplified in the following:

*Mars*—"God of war in Roman mythology."

*Mosaic*—"A number of brightly colored stones—no, tiles—put together to form a design."

*Orange*—"A citrous fruit; orange in color—fruit is named therefrom."

*Treasury*—"Place where a cooperating group keeps the money."

*Forfeit*—"Something given up—not a sacrifice."

B seldom attempted to define a word she did not know. At the conclusion of this test she was not pleased with her record; she stated that she knew "only the easy words."

Although B's score upon the vocabulary test was unusual, it alone does not reveal her capacity to see relations and to develop inferences. Several responses, of which the following is illustrative, demonstrated these abilities: B, unable to define the word "charter," stated, "I can't define it exactly, but I know that Insull just chartered a boat." (The Chicago daily newspapers had, on the day the child was tested, carried full and glaring accounts of the chartering episode.)

The qualitative superiority of the child appeared also in other sections of the Binet test. Ability to sustain attention and to exercise autocriticism were specially noticeable in the ingenuity test (XVIII-6), as well as in B's general attitude throughout the several days of testing. The following analysis give the detail of successes and failures upon the Stanford-Binet test:

Year level	Test number								Credit	
	1	2	3	4	5	6	7	8	Yrs.	Mos.
XII	x	x	x	x	x	x	x	x	12	0
XIV	x	x	x	o	x	o			1	4
XVI	x	x	x	x	x	o			2	1
XVIII	o	x	x	x	x	o			2	0
								Total	17	5
x=credit								Correction		15
								TOTAL	18	8

#### VALIDITY OF RATING

The IQ seems reliable and not too high for the type of ability measured; indeed, near successes were earned in several tests not credited (noticeably in XIV-4 and -6, and in XVI-6). A retest, one week after the initial examination, showed further the essential reliability of the first testing.

In order to validate the extraordinary Stanford-Binet rating, several group tests were given and the following results were secured:

Otis S.A. (Intermediate, Form A) IQ 180. B made a score of 66 upon this 20 minute test; the norm for children of her age is 18!

Army Alpha (1925 Revision). IQ 185. B's score, 119, places her at the 87.5 percentile for the "native white draft."

McCall Multi-Mental—Score 369. This, when considered in terms of B's chronological age, yields an IQ of 170.

Beyond doubt these test results, corroborating those from the Stanford-Binet, reveal a child whose test-intelligence is of surpassing degree.

#### PERFORMANCE TESTS

Superiority was displayed by B upon performance tests. Although the test responses were by no means similar in quality and excellence to those of the "abstract" intelligence tests, they showed that B is not lacking in "concrete" intelligence, "motor development," "prudence and forethought," or whatever these measures gauge. Because of the somewhat different abilities assayed by the verbal and by the non-verbal tests, it is not surprising that discrepancies are found.<sup>1</sup>

The Grace Arthur Performance Scale was administered. B's mental age on this scale was 10 years, 7 months; her IQ 112. The only remarkable response was to the Knox Cube Test in the series, on which B scored considerably above the norm for 15 years, 6 months (the "top" of the test). The Porteus Maze Tests yielded an IQ of 143. Each of the mazes through the Adult II level was solved.

#### SCHOOL ACHIEVEMENT

B is now in the low fifth grade. She has received one double promotion (from the low second to the low third). Other accelerations have been proffered but these have been refused because B's mother does not want her to be too young for full participation in the activities of her school group. B has adapted unusually well to school demands, performing ably in subjects which she likes and succeeding moderately in those to which she is indifferent. Thus her grades in reading, English, history, and spelling have been uniformly high, while those in arithmetic, music, and drawing have been just average (for the past year). Contrary to the prevalent belief to the effect that Negro children excel in music and in certain types of art, we find B to have little ability and interest in these fields. She succeeds to an inordinate degree in the tasks commonly thought to require and to elicit "abstract" intelligence. B's favorite subject is science. Chemistry attracts her to the extent that her vocational ambition is to be a chemist. Her reading follows this interest; it seems that the school might do well to capitalize upon this and to provide a condition for learning such that the inchoate ability may find expression in a peak of rare attainment. In the survey through which B was identified she was nominated by the teacher as the "best student" in the room.

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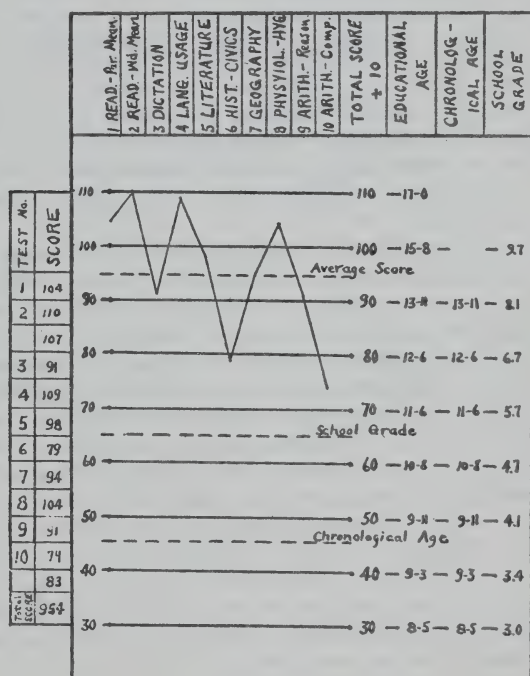
<sup>1</sup>Similar discrepancies have been reported by L. M. Terman and L. S. Hollingworth.



Teachers were asked to nominate (1) the most intelligent pupil and (2) the best student. Interesting is it that the girl nominated as "the most intelligent" in the room is about four years older than B and has an IQ, derived by a group test, below 100. (In justice to the teacher it must be said that she had taught the group for only a short period of time.)

The New Stanford Achievement Test, Form W, was administered in one day, with appropriate rest periods. Figure 1 presents the profile of B's achievement upon this test. Highest scores were made on those tests

Figure 1. Educational Profile of B's Accomplishment on the New Stanford Achievement Test, Advanced Examination



which appear not to depend largely on school experiences and drill, i.e., reading and language usage. (An exception here is the high score upon the physiology and hygiene test; this score reflects B's expressed interest in science.) Her lowest score is in arithmetic computation, although in this she is accelerated almost one year beyond the norm for her grade

and more than two years beyond her age norm. Her composite educational age is 15 years, 3 months, an equivalent of the norm for grade 8.9; this attainment is about three and one-half grades in excess of her actual grade placement. In none of the tests does B's score indicate that her educational attainment is consonant with her high mental ability.

B appears to be a typical victim of the educational lockstep of large educational systems which usually can make little provision for children of very superior ability and which frequently fail to recognize the abilities of these deviates. B has approximately 45 classmates of varying abilities, and the teacher's special efforts are inevitably devoted to the duller pupils. Under such a régime rare ability is usually sacrificed.

#### DEVELOPMENTAL HISTORY

The following items were secured from B's "Baby-book" and from the mother's reports. B, an only child, was born November 18, 1924. The mother was then 27 years of age, and the father, 31. B weighed  $6\frac{3}{4}$  pounds at birth, 14 pounds at three months, and  $17\frac{1}{2}$  pounds at nine months. At age 9 years and 5 months, B weighed 60 pounds and was 50 inches in height; this is normal for a child of her height and age (Baldwin-Wood norms).

B walked a few steps at eight months (under the excitement of running after a dog), but walked no more until she was twelve months old. She employed short sentences when she was about sixteen months of age. Her mother reports that B expressed her thoughts in sentences, rather than in isolated words, almost from the beginning of language development; she excited considerable comment among friends by displaying an extensive vocabulary and by saying nursery rhymes at age two.

B was taught to read by her mother at age four by the "picture-story" method (she knew the alphabet long before). A few lessons only were given and thereafter B read and has continued to read independently.

B has had no serious illnesses or accidents; her health history appears normal and her physical condition at the present time is excellent. Furthermore, she seems unusually well balanced from the standpoint of mental hygiene. B exhibits regularity in habits, sleeps soundly, seldom reports dreams, displays no unusual fears, and adapts herself quickly and successfully to the demands of her child-group.

#### FAMILY BACKGROUND

B's parents appear distinctly above the average both in intelligence and in academic training. The mother finished a two-year normal course and taught for a number of years in a metropolitan school system. The father

is an electrical engineer, a graduate of Case College of Applied Science; he has pursued graduate studies at Cornell University, and has done some college teaching. At present he is a practising electrical engineer. One of the father's academic achievements was that of completing the four-year course of a large city high school in three years. Several of B's ancestors have revealed unusual ability. One of her maternal grand-aunts was the valedictorian of her high school class in Cleveland. Her maternal great-grandfather (who is still active and robust at age 82) was private secretary to each of four executives of a large railroad system; her maternal grandfather, an accountant, was at one time Grand Keeper of Records and Seals (State) for a large fraternal organization. Her paternal grandfather was an inventor and manufacturer of polishes and waxes; his products were of enough merit to be sold by department stores in Chicago. Without doubt the family background indicates superior heredity.

#### RACIAL COMPOSITION

The mother reports B to be of pure Negro stock. There is no record of any white ancestors on either the maternal or the paternal side.

#### SOCIABILITY, READING, AND PLAY INTERESTS

B has a remarkably well-developed personality when one considers the wide gap between her physiological and mental maturation levels. She seems to get along well with other children; she is not snobbish, and (fortunately) has no idea of her general superiority. Her play interests are somewhat "tom-boyish," and her favorite leisure-time activity, after reading, is playing with her miniature chemistry set. She no longer plays with dolls and toys that normally interest girls of her age. Although B states that she likes to play with children younger than herself, one of the writers observed her with such a group and found that she was telling stories to the group. B's preferred leisure-time activity is reading; she spends about 28 hours weekly in this activity. Some of her favorite books are: Louisa Alcott's works, *Up from Slavery*—Washington, *Arabian Nights*, *Twenty Thousand Leagues Under the Sea*, *The Wonder Book of Chemistry*—Fabre, *The Boy Chemist*—Collins, *The Book of the Microscope*—Collins, *Buried Cities*—Hall. The mother of one of B's friends relates that B visits her home frequently to play; often she discovers a book she has not read, whereupon she announces that she will read the book rather than play. Both of the girls then select books and occasionally spend the entire afternoon reading. It is of interest that this chum is a girl of IQ 142 who is one year older than B. Apparently, the accelerated mental development of both girls is an important factor in effecting their attachment.

Speculation regarding the factors contributing to the development of such a child is arresting. B is not a child who has been "pushed." She has obtained her formal educational experiences in a school which is certainly not above the average, and there has been no special recognition, either on the part of the school or of the parent, of her *extremely* superior ability. However, she has had the good fortune to have an intelligent mother who understands the importance of wide and varied experiences in the lives of children. B has been to the museums, art galleries, parks, and large stores which a metropolitan center offers. These provide experiences, of course, along with her wide reading, which contribute something to her ability to make a high score on objective tests. From a quantitative standpoint B's present home background is now about average, although prior to the economic depression it was distinctly superior. Although, at present, her home is only average, there is, nevertheless, an intangible quality in her environment which nourishes rare ability and stimulates attainment. While both the extreme hereditarian and the environmentalist can find in these data ample support for dogmatizing concerning the importance of heredity or of environment, the writers, after months of study of this child and the social setting, believe that the provenance of this child's rare ability can be traced to a fortunate biological inheritance plus a fairly good opportunity for development.

The case appears to have unusual psychological significance. The fact that we can find a Negro child whose IQ falls in the very highest range indicates that Negro blood is not always the limiting specter so universally proclaimed in discussions of intelligence measured by the Binet technique.

The case is of significance further in that it demonstrates that we may discover extreme deviates in any school population, unrecognized and denied the types of educational experiences which are necessary for their best development, as well as for the best interests of the social order.

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POST-WAR TRENDS IN EMPLOYMENT, CRIME, INSANITY,  
AND HEART DISEASE<sup>1</sup>

("The Prohibition Era")

RAY MARS SIMPSON<sup>2</sup>

Since the termination of the World War (Nov. 11, 1918), there has been a recurring tendency for many serious-minded individuals to place the blame for many social ills upon stresses and strains assumed to have been incurred during the period of martial conflict. Instability in adolescent adjustments, adult social relationships, sexual poise, economic order, and breaches in family unity are a few of the social ills attributable to the World War. On the other hand there are many persons who blame the "Era of Prohibition" (1919-1933) for all the aforementioned difficulties. Since the Stock Market crash in October, 1929, many have turned to "the depression" in seeking a cause for social and individual maladjustments.

It is difficult to prove that these symptoms were produced directly by either the World War, "The Prohibition Era," or the depression. Probably all three of these so-called causes should be considered as symptoms of many underlying defects in the social and economic order. One should be careful not to confuse symptom with cause. Frequently gaps in factual analyses are filled with hypotheses devoid of any real foundation. Bearing these uncertainties in mind, it becomes necessary at the outset to caution the reader against drawing any dogmatic conclusions from the facts and figures presented in this article.

Four factors have been chosen for discussion which are assumed to indicate stress in the economic, physical, mental, and social activity of human beings. These four factors are: employment, heart disease, crime, and insanity. The first purpose of this article is to show the trends which the above four factors have taken during the period from 1919 to 1932. The second objective is to study trends in crime, insanity, and heart disease during the business depression (1930-1932) in contrast with the trends in these same factors during preceding years of prosperous business activity.

A casual survey of Figure 1 reveals the following self-evident trends in the State of Illinois during recent years:

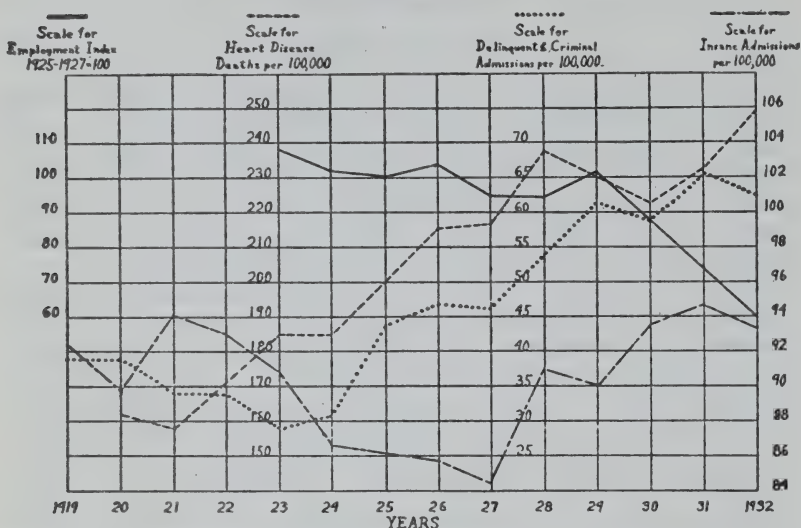
1. Business conditions remained good from 1923 to 1929 then declined rapidly following the Stock Market crash in October, 1929.

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<sup>1</sup>Studies from the Institute for Juvenile Research, Chicago, Paul L. Schroeder, M.D., Director.

<sup>2</sup>Psychologist, Institute for Juvenile Research, Chicago. Stationed at the Illinois State Penitentiary, Pontiac Unit.

FIGURE I  
RECENT TRENDS IN EMPLOYMENT, HEART DISEASE,  
CRIME AND INSANITY IN ILLINOIS 1919-1932



2. Admissions to the eight institutions for criminals and delinquents in Illinois have shown an almost constant tendency to increase since 1923.

3. Admissions to the ten institutions for the insane in Illinois decreased from 1921 to 1927 and since that time (1927) have shown a marked increase.

4. Deaths due to heart disease have been increasing rapidly since about 1920.

Perhaps a word of explanation here will serve to help the reader understand Figure 1. It should be noted that four separate scales are used in the same figure in order to make direct comparisons between the trends of the four factors under consideration. It should be borne in mind that this study deals with *trends* and that the various scales were independent of each other. The first scale to the left in Figure 1 serves as a point of reference in dealing with the Employment Index. The years from 1919 to 1932 are represented on the base line at the bottom of the figure. The following example should enable one to understand clearly Figure 1. Find the year 1929 on the base line and follow it upward to the point where it crosses the heavy unbroken line which represents conditions of employment. By following the horizontal line to the scale under "Employment Index" at the extreme left of the figure it will be

found that business conditions were slightly above 100 for the year 1929. It will be noted that employment declined abruptly following the Stock Market crash in 1929.

The Index of Employment used in Figure 1 was compiled by the Illinois Department of Labor.<sup>9</sup> The monthly average for 1925-1927 is taken as a basic index of 100. Reports from over a thousand various industries are considered in the yearly index for 1932. These figures afford a fairly reliable index of business conditions in general in the State of Illinois. From 1923 to 1931 the average employment index for each year was as follows: 108.0, 103.0, 100.5, 96.1, 95.4, 101.0, 98.3, 75.0, and 60.6.

Figures covering the number of deaths from heart disease in Illinois were secured from the U. S. Bureau of the Census. The rates per 100,000 population from 1920 to 1930 are as follows: 161.9, 157.8, 172.1, 186.3, 184.9, 198.8, 216.8, 217.0, 233.0, 233.3, 223.1, 232.1, and 247.0.

Data covering the admissions to institutions for criminals and delinquents in Illinois were secured from Mr. E. R. Amick, Statistician, Department of Public Welfare, State of Illinois. The eight institutions covered are the Illinois State Penitentiary at Joliet, Southern Illinois Penitentiary at Menard, Illinois State Reformatory at Pontiac, Women's Prison at Joliet, Oakdale Reformatory at Dwight, School for Boys at St. Charles, School for Girls at Geneva, and the State Farm at Vandalia. The rates per 100,000 population from 1918 to 1932 are as follows: 38.67, 38.60, 38.88, 34.01, 34.37, 28.00, 31.33, 44.02, 47.17, 45.97, 51.82, 60.96, 59.10, 65.21, and 62.94.

Figures dealing with the total insane admissions (first admissions plus readmissions) to the 10 institutions for the insane in Illinois were also supplied by the State Statistician. The yearly rates per 100,000 population from 1919 to 1932 are as follows: 92.37, 89.54, 94.21, 93.25, 91.26, 86.70, 86.24, 85.90, 84.65, 91.28, 90.01, 93.53, 94.72, and 93.65.

One of the initial purposes of this article was to make direct comparisons between business trends (as reflected in the employment index) and trends in crime, insanity, and heart disease. These comparisons will now be drawn.

The most striking fact to be stressed is that the so-called "crime wave" started back in 1923 or 1924! From 1924 to 1929 (Stock Market crash) crime increased from 31.33 to 60.96 per 100,000 population! During the first three years of the depression (1930-31-32) the rate per 100,000 has increased very slightly in comparison (59.10, 65.21, 62.94). During the three-year period covering 1927 to 1929 the rate increased about 15 per 100,000 population while during the three-year period covering 1930 to 1932 the rate increased on an average of only 1.45 per 100,000 population above the figure for 1929. It seems that the depression has exerted very

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<sup>9</sup>The Labor Bulletin, Volume XI, Number 6, January, 1932.

little influence as a causal factor in the general rate. In fact, the evidence presented here seems to suggest at least that the depression has tended to stop the so-called crime wave rather than to initiate it. Of course, this is merely suggestive evidence. It should be noted that the number of individuals admitted to institutions for delinquents and criminals in Illinois gives only an approximate index of the total amount of crime in a given geographical area.

Elsewhere the author (1) has shown that "yearly increases and decreases in the number of prisoners admitted to the Illinois State Penitentiary do not consistently conform to yearly increases and decreases in employment." Furthermore, "prisoners tend to blame business conditions for being unemployed at the time the crime is committed regardless of whether business conditions are good or bad." In a later article it was pointed out (2) that "the trend in court actions does not consistently follow the trend in business as indicated by the employment index." "The yearly rise and fall in the number of arrests in the City of Chicago shows a consistent tendency to follow the rise and fall of business as indicated by the employment index." In short, it seems that so-called "boom times" may contribute more to cause crime than periods of depression.

Undoubtedly unemployment is responsible for widespread fears of economic insecurity and actual need. It seems reasonable to believe that periods of depression create many new problems for individuals and families who customarily live in marginal economic security. It may be possible that the stress occasioned by meeting new economic problems may lead to crime and delinquency in some instances but the facts do not seem to support this as a general hypothesis. It should be borne in mind that the splendid work done by many charitable organizations and governmental agencies may serve in a way to offset any harmful effects which might arise.

The yearly trend in insanity as shown in Figure 1 in a certain sense gives another index of social solidarity and collective individual stability. It seems evident that the trend in insanity does not follow the trend in crime. It may be possible that business stress contributes to the incidence of insanity. It should be noted that the two high levels for admissions to institutions for the insane coincide with the business depressions of 1921 and of 1930-31-32. When business conditions were about normal in 1924, 1925, 1926, and 1927, insanity was at a low level. In 1928 and 1929 business was unusually active. It should be noted that the admissions to the ten institutions for the insane in Illinois give only one index of the actual amount of insanity in Illinois over the period under consideration.

Deaths due to heart disease provide another index of social stress. During the five-year period from 1920 to 1924 (inclusive) the number of



deaths due to heart disease varied from 157.8 to 184.9 per 100,000 population. In contrast, the five-year period from 1928 to 1932 showed a distinctly higher number of deaths due to diseases of the heart with the rate per 100,000 population ranging from 223.1 to 247.0. Again, it seems as if the depression should not be blamed for the present high level of deaths due to heart disease. It is interesting to note that the number of deaths in 1928 exceeded those for 1929, 1930, or 1931. It should be noted that there has been a well-marked upward trend in deaths since 1920.

The figures presented here raise many questions which the author is unable to answer. They are offered as a commentary upon the physical, mental, or emotional instability of human beings in a setting of intense social, economic, and political post-war adjustments.

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## BOOKS

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CARL MURCHISON. [Ed.] *A Handbook of General Experimental Psychology*. Worcester: Clark University Press; London: Oxford Univ. Press, 1934. Pp. xii+1125.

In 1929 Dr. Carl Murchison published *The Foundations of Experimental Psychology*, which contained special chapters by well-known investigators in fields basic to psychology. From the first this book took a most important place as a fundamental reference work for the serious student of scientific psychology. But research progresses rapidly in the life sciences. Fortunately, therefore, Dr. Murchison has now brought together a revised *Foundations* as three Handbooks. The first of this series of Handbooks appeared in 1933 under the title, *A Handbook of Child Psychology*, and the second volume, which is now under review, was published in 1934. The third volume, *A Handbook of Social Psychology*, will soon be published. The new *Handbook of General Experimental Psychology*, therefore, covers a somewhat more limited field than the old *Foundations of Experimental Psychology*. But in conjunction with the other Handbooks the total field will be much more adequately covered than was the case in the old single volume.

In this review a brief summary and criticism of each chapter will be offered and finally an evaluation of the entire volume will be presented.

1. *The Study of Living Organisms*. By W. J. Crozier and H. Hoagland.

This chapter begins in a quotation from Santayana: "Scientific psychology is a part of physics, or the study of nature; it is the record of how animals act." Following this view the whole chapter deals with certain basic mechanisms of behavior in which organic performance is described and the possibility of prediction indicated in relation to the magnitude of known variables. As might be expected the concept of the tropism is dealt with in detail as an exemplification of this method. A most interesting part of this discussion is the treatment of compound tropisms and functional genetics. An application of the Arrhenius equation in a consideration of "chemical pace makers" in relation to measured behavior is next presented. Here even the judgments of duration of a human subject at different temperatures are brought under this general law. "Spontaneous" activity is also considered. A bibliography of 233 titles is appended.

In spirit this chapter well sets the pace for the rest of the volume. It brings together an altogether respectable amount of quantitative material which demonstrates that an exact science of behavior is not only a theoretical possibility but an accomplished fact.

2. *Mechanisms and Laws of Heredity*. By T. H. Morgan.

In this chapter, as in the old chapter in the *Foundations*, a clear review

is presented of the reasons why the doctrine of the inheritance of acquired characters is today generally rejected. The mechanism of Mendelian heredity is next summarized. The problem of human inheritance and psychology is then treated. In conclusion it is asserted that "Until more definite information is obtainable concerning mental traits and emotional reactions, some of us remain extremely skeptical of the crude and often forced attempts that have been made so far to determine what is inherited and what is acquired after birth." A bibliography of 240 titles is appended.

Both as a positive contribution to an understanding of heredity and as a corrective for those who too easily explain all things psychological by the easy method of asserting them to be inherited, this chapter is of great value to the student of mental life.

3. *The Mechanism of Reaction.* By A. Forbes.

In this chapter a review is first presented of the evolution of the mechanism of reaction and of the general function of the total response system. The physiological properties of nerve and muscle, especially in relation to the all-or-none law and the phenomena of metabolism, are next presented. The newer views in regard to the action of the autonomic system on muscles and glands are described. Finally, the special functions of the central nervous system are considered. Here it is asserted, in contrast with the article in the old *Foundations*, that: "Recent evidence points to the probability of the release of chemical substances as the basis of central excitatory and inhibitory effects." Integration in the centers is considered and the assertion made that no "vital force" need be postulated to explain the higher mental activities of man. A bibliography of 188 titles is appended.

This new and revised chapter, like its predecessor in the old *Foundations*, presents within convenient compass an excellent review of physiological facts which must be understood by every serious student of psychology.

4. *The Labyrinthine and Postural Mechanisms.* By J. G. Dusser de Barenne.

In this chapter a history of knowledge of the labyrinthine sense is first presented. After discussing the methods used in the study of this sense the various labyrinthine reflexes are considered in detail. Here are treated reflexes dependent upon angular acceleration, such as those involving the muscles of the eye, neck, limbs, and trunk. Reflexes dependent upon linear acceleration, caloric stimulation, mechanical stimulation, and electrical stimulation are also considered, as are the various classes of positional reflexes. The results of labyrinthectomy and the central-nervous-system mechanisms of labyrinthine reactions are also dealt with. A bibliography of 216 titles is appended.

This chapter, which did not appear in comparable form in the old *Founda-*

tions, gives the psychological reader a clear and critical account of the best work which has been done in recent years in this important field. It is needless to point out that any student of behavior must find the increasing body of fact concerning the mechanisms of posture significant in many different ways.

5. *Hunger and Thirst*. By W. B. Cannon.

In this chapter the present knowledge of the mechanisms by means of which hunger and thirst are controlled is presented. The most notable addition since the previous chapter in the old *Foundations* is a summary of the work of Gregersen, in which a definite relationship between eating and water intake is demonstrated. A bibliography of 30 titles is appended.

The psychologist finds in this chapter an account of certain basic life processes which are of great interest in themselves and in relation to the motivational life of the organism. This chapter may well be read in conjunction with the chapter by Dr. Blatz in the *Handbook of Child Psychology*.

6. *Emotion: I. The Neuro-humoral Basis of Emotional Reactions*. By P. Bard.

In this chapter a brief outline is given of the history of knowledge in regard to the bodily basis of emotion, with especial emphasis upon the development of knowledge of the structure and function of the autonomic nervous system, the humoral system, and the thalamus. The part of these various mechanisms in emotional behavior is next treated. Finally, the evidence against the James-Lange theory of the emotions is summarized and the advantages of Cannon's Diencephalic Theory are presented. A bibliography of 88 titles is appended.

Many psychologists may still wish to question certain aspects of the author's major thesis, but certainly in this chapter a clear and, it may be said, authoritative statement of the diencephalic theory is given.

7. *Emotion: II. The Expressions of Emotion*. By C. Landis.

After presenting brief definitions of technical terms used in the study of emotion, the author treats in turn in relation to emotion the criteria of the emotional state, facial expression and vocalization, bodily activity, and visceral responses. In the latter category are included changes in circulation, blood, heart, respiration, metabolic rate, and gastro-intestinal activity. The rôles of the endocrine glands and of the peripheral, central, and autonomic nervous systems in emotion are next considered. The electrical expressions of emotion, emotion and the feelings, and anhedonia are each considered in separate sections.

The well-known insight of the author of this section has never been better displayed than in these pages. No psychologist interested in emotion can afford to neglect the significant summary and criticism which is offered in this chapter.



8. *Learning: I. The Factor of Maturation.* By C. P. Stone.

After a discussion of the general problem of maturation in relation to the older concept of instinct, a summary of developmental schedules of behavior in fetal and neonatal animals is presented. Under the heading of "Hereditary Mechanisms," the primary and secondary regulators of maturation are considered. Under the first of these headings such concepts as those of ancestral habits and genetic alteration of behavior in rats and dogs are considered. The evidence in regard to the maturational factors in the attainment of puberty is considered. Under the second heading, neural patterns and humoral agents are discussed. In conclusion, the dependent and interdependent relationships between maturation and learning in postnatal life are discussed in relation to experimental control of environmental stimulation and the age of the experimental organisms. A bibliography of 51 titles is appended.

The reviewer still does not feel sure that Dr. Stone has made a perfect case for the feasibility of the separation of maturation and learning, but certainly the present chapter brings together material that is of the greatest importance in considering this vexed problem and in the understanding of the complex dynamic processes which are involved in the development of behavior.

9. *Learning: II. The Factor of the Conditioned Reflex.* By C. L. Hull.

Following an historical introduction the author turns to a consideration of an experiment of Anrep and one of Hilgard and Marquis as typical conditioned-response experiments. Conditioning in relation to the following responses is then considered: the knee jerk, the plantar reflex, the abdominal reflex, the Achilles reflex, reflex withdrawal from a painful stimulus, the eye wink, the pupillary reflex, the motor responses of breathing, vasomotor constriction, the galvanic skin reaction, the rise in pitch of the voice, the fetal "kicking" reaction, the food-taking reactions of neonates and older children, salivation, vomiting, defecation and urination, diuresis, and defensive blood reactions in immunity. Conditioning as a function of the physical characteristics of a wide range of stimulus variables and special properties of conditioned reflexes are next treated in detail. In conclusion, the possibility that in the study of behavior principles discovered by conditioned-reflex technique may form an unambiguous theory comparable to the quantum theory in modern physics is suggested. A bibliography of 119 titles is appended.

In completeness and positive criticism this chapter is a major and unique contribution to the basic understanding of one of the most fundamental topics in psychology.

10. *Learning: III. Nervous Mechanisms in Learning.* By K. S. Lashley.

After pointing out the various meanings attached by various authors to

the word learning, the author of this chapter considers the origin of behavior patterns during ontogeny and phylogeny. The relationship between learning and the quantity of neural tissue and the histology of nerve is treated. On the basis of this study the general characteristics of the organization of habits as worked out in controlled animal experimentation is next dealt with. A special section is devoted to a consideration of the light thrown on central integration by injuries to the nervous system, and a central theory of imagery is defended. The traditional "laws of learning" are next considered in relation to the theories of the mechanism of learning. In conclusion, it is asserted that descriptive studies of learning must be extended before any attempt to formulate a general theory of learning will be of value. A bibliography of 42 titles is appended.

Both as a positive statement of much important experimental research and as a wholesome check upon the enthusiasm of those who believe that they know exactly how the brain works in learning, this chapter must be regarded as one of the most important in the whole volume.

11. *Learning: IV. Experimental Studies of Learning.* By W. S. Hunter.

After showing that learning is intimately involved in the development of all behavior patterns, the author turns to consider the special phenomena of learning which have been revealed by psychological investigations. He considers in detail the nature of the learning curve in such a way as to include a treatment of insight. Whole versus part methods of learning, the distribution of effort, age and learning, and the relation between speed of learning and retention are next considered. The problem of retention and forgetting is dealt with in detail and the position supported that forgetting is not mere decay but rather an active process. The transfer of training, the relation of initial and final abilities, and backward association are also dealt with. In conclusion it is asserted that "Learning in its basic character thus depends upon the fulfillment of certain temporal conditions in stimulus relationships and upon the presence of unconditioned or well-established conditioned responses with their gradients." A bibliography of 168 titles is appended.

As a statement of known facts in regard to the psychology of learning this chapter in its revised form continues to occupy the high place in scientific psychological literature which was previously attained in the chapter on the same topic by the same author in the old *Foundations*. No layman can read this chapter and again ask, "Is psychology a science?" Here the results of the scientific method in psychology speak for themselves.

12. *Work of the Integrated Organism.* By E. S. Robinson.

This chapter is devoted to a consideration of the experimental facts and theories which have been developed in an effort to understand the basic mechanisms of work. After a definition of terms the problem of energy

transformations and work is considered. The work decrement and its cause is next considered in relation to a large number of summarized experiments. As a result of this consideration a series of seven principles are proposed to describe the work decrement. These principles are formulated in terms of changes in stimulus-response connection. "Warming up," exhaustion, facilitation, and distraction, effort, and other special factors in the study of work of the intact organism are also treated. A bibliography of 131 titles is appended. This bibliography is made more useful in that references which themselves contain bibliographies are specially indicated.

This chapter deals with an important topic that was not covered in the old *Foundations*. Professor Robinson's summary and interpretation of the difficult literature in this field is therefore in every sense a valuable and welcome addition to the volume.

13. *Vision: I. Visual Phenomena and Their Stimulus Correlations*. By L. T. Troland.

This chapter deals largely with introspectively describable visual experience and correlation between such experience and physical and physiological factors. After a treatment of the analytical factors in visual experience, the nature of the visual stimulus, of photometric measurement, and the anatomy of the eye are briefly summarized. The psychophysics of brilliance and of the chromatic attributes is next discussed in detail and finally brief sections are devoted to the binocular relations of color, the monocular laws governing visual form, the visual perception of motion, and the relationship between visual experience and the cerebral cortex. A bibliography of 104 titles is appended.

All critics must agree that this chapter, which was fortunately revised before the author's untimely and tragic death, is one of the most significant in the volume.

14. *Vision: II. The Nature of the Photoreceptor Process*. By S. Hecht.

After a general consideration of the present status of Müller's doctrine of specific qualities the author turns to a detailed analysis of the photoreceptive processes. Threshold relationships, the duality of sensory process, dark and light adaptation in their physiological bases and in the special conditions of the eye are in turn considered. An elaborate consideration of the physiological factors underlying Talbot's law is given, as is a treatment of the present status of knowledge in regard to chemical light-sensitive substances in living tissues. Intensity discrimination, visual acuity and illumination in relation to the physiology of the receptor process, and the facts and theories of color vision are all treated in some detail. A bibliography of 210 titles is appended.

This masterful chapter by a foremost research worker brings to the psychologist in convenient and direct form the most recent progress in this significant field of research.

15. *Vision: III. Some Neural Correlations.* By C. H. Graham.

This chapter is largely devoted to a consideration of those electrical phenomena of the photoreceptive mechanism which are functions of light stimulation. The nature of the discharge in a single fiber is first treated and then the characteristics of optic-nerve activity and of the retinal potential are discussed in detail. The physiological as contrasted with the "localization" problems of the central-nervous-system phenomena of vision are next considered and the newest work on the electrical phenomena associated with activity of the visual cortex is briefly and clearly summarized. A bibliography of 127 titles is given.

Many students define psychology as the science of behavior. At least in the reviewer's estimation, however, behavior can never be fully understood until all of the processes intermediate between stimulation and response are understood. From this point of view this chapter is of especial interest to the psychologist.

16. *Audition: I. Auditory Phenomena and Their Stimulus Correlations.* By H. Banister.

After a brief review of the physics of sound the author turns to the problem of audition in relation to "pure tones." In this section tone, tone character, pitch, loudness, and various auditory limens are considered. Special phenomena of compound tones and noise are next treated. A section is then devoted to beats, combination tones, consonance, and dissonance. Finally, auditory perception of space, speech, deafness, and fatigue and noise are briefly considered. A bibliography of 75 titles is appended.

Much important work is summarized in this chapter, and although it does not attempt to cover its field in as great detail as some of the other chapters of the volume, it fills a real need.

17. *Audition: II. Theories of Hearing.* By H. Hartridge.

In this chapter the known facts in regard to the morphology of the ear are first reviewed and then the various theories of the operation of these anatomically described structures are considered. The telephone, sound-pattern, sound-wave, volley, and resonance hypotheses in regard to hearing are reviewed briefly and the physiological evidence bearing upon such theories is summarized. A special form of the resonance hypothesis is then restated and the evidence in favor of this theory presented in detail. A bibliography of 53 titles is appended.

This chapter well supplements the chapter which precedes it by Dr. Banister. In this chapter, however, the section entitled "Reply to Criticisms" does not in every way satisfy the reviewer even concerning certain factual matters.

18. *Audition: III. The Physiological Phenomena of Audition.* By H. Davis.



This chapter outlines the information which has been obtained by electrical methods during recent years concerning the function of the auditory mechanism and especially in the study of the Wever-Bray effect. The anatomy of the auditory mechanism, especially in its central connections, is first presented. The characteristics of the electrical phenomena at various levels of this mechanism are then treated, dealing first with the cochlear response and then passing to the consideration of the action potentials of the auditory neural mechanisms up to and including that of the cortex. The significance of these findings for auditory theory is presented in conclusion. A bibliography of 39 titles is appended.

Like Dr. Graham's chapter on the physiological phenomena of vision which has just been reviewed, this chapter presents a valuable and significant interpretation of certain aspects of a most rapidly developing field of sensory physiology which is of direct significance for the psychologist.

19. *Chemoreception*. By W. J. Crozier.

In this chapter the receptor mechanisms of smell, taste, and the common chemical sense are discussed. After a general consideration of the nature of stimulation, the special phenomena of olfaction are treated. The common chemical sense and taste are next dealt with. In the discussion of taste the chemical nature of the stimulus in relation to the physiological processes of the sense is given in detail. A bibliography of 139 titles is appended.

This chapter is admirable from the physiological point of view. The psychologist may wish to amplify it somewhat on the descriptive side, although the reviewer must agree that much of the work on the "experiential" side of these senses is open to serious scientific criticism.

20. *The Pressure, Pain, and Temperature Senses*. By J. P. Nafe.

After a preliminary analysis of the problem of skin sensitivity, the nature of nerve discharge initiated on the cutaneous surface is considered in the introduction to the chapter. The problem of the relationship between quality and the end organs of the skin is treated. The possible significance of peripheral blood vessels in the physiological mechanism of the skin senses is next discussed as a preliminary to a review of the special problems embraced in the temperature senses. The pressure and pain senses are treated in detail. The problems of epicritic and protopathic sensitivity, the effects of drugs on the skin senses, and the kinesthetic and visceral senses are also discussed. Finally, a quantitative theory of feeling is presented. A bibliography of 211 titles is appended.

In reviewing Dr. Nafe's chapter in the old *Foundations* the present reviewer wrote: "The author may be very nearly all right or he may be very nearly all wrong, but the chapter that he has prepared is certain to bring about that sort of experimental investigation by which alone the problems of the skin senses are to be solved." Experimentation has been done as a

result of this formulation, but unfortunately the reviewer feels that he must still speak as he did in 1929. It is hoped that a more positive statement can be made when the next edition of the *Handbook* appears.

In general summary, it may be said that the separate chapters of this book seem to the reviewer to be of uneven excellence. As a whole, however, the publication of this volume will probably be of more value and importance to scientific psychology than any similar event in recent years. The editor is certainly to be congratulated.

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# PERSONALITY FACTORS IN MARITAL COMPATIBILITY\*<sup>1</sup>

*From the Department of Psychology, Stanford University*

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LEWIS M. TERMAN AND PAUL BUTTENWIESER<sup>2</sup>

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## I

### NATURE OF THE INVESTIGATION

Studies in the psychology of personality have suggested the possibility that particular combinations of personality traits in husband and wife may be favorable or unfavorable to marital happiness. That some combinations must be more favorable than others has been accepted as a reasonable hypothesis by practically everyone to whom we have put the question. Although opinions differ as to the probable effect of any specific combination, there are certain combinations which a majority of people seem inclined to regard as more likely than others to affect the success of a marriage. For example, one would hardly expect a man and woman, both highly neurotic, to achieve a very high order of marital happiness. The mating of extremely dominant or extremely introverted personalities seems also generally to be regarded as unpromising.

Literature affords many examples of the difficulty which extroverts and introverts encounter in trying to understand or appreciate one another. Between a Hamlet or Tasso and the extreme extrovert of politics or business Shakespeare and Goethe have thought to find an impenetrable wall. But are the dramatic cases depicted by poets

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<sup>2</sup>The senior author is responsible for the plan of the study, for supervising the collection of data, and for the methods used in treating results. Dr. Buttenwieser supervised the clerical and statistical work and gave invaluable assistance throughout in connection with the treatment of the data. The report was written by the senior author, with the assistance of Winifred B. Johnson. The field work was done by Mrs. Ruth Wilson and Mrs. Ann Bent, to both of whom the authors are greatly indebted for the skill and devotion with which their difficult task was performed. Mrs. Linna Culver gave expert assistance in preparing the data for Hollerith treatment.

and novelists typical? In his autobiography an eminent psychologist who describes himself as markedly introverted finds cause for rejoicing in the extroverted qualities of a wife who has smoothed his social contacts and in other ways helped to make the marriage a highly successful one (4). Similar arguments could be offered in favor of the mating of dominant with submissive or of social with non-social.

There are many other types of attitudes and interests which might conceivably have a bearing upon marital compatibility. Among these are mental masculinity or femininity, interest maturity, aesthetic preferences, religious beliefs, and both intellectual and vocational interests. A census of opinion would doubtless disclose every variety of belief with regard to what would constitute maritally favorable and unfavorable combinations of such traits, for it is possible to find among one's acquaintances particular instances in favor of almost any type of mating.

Progress in this field will depend largely upon the reliable determination of specific personality traits possessed by happily and unhappily married couples. At present not only is the "measurement" of personality far from objective, but there is no general agreement with respect to what constellations of traits exist or how they show themselves in every-day behavior. It is notorious that current personality tests can not be uncritically accepted as measures of the traits they purport to measure. The low intercorrelations of the numerous tests of introversion-extroversion offer a warning example. The Bernreuter Personality Inventory, originally presented as a measure of four traits, named by the author "neurotic tendency," "self sufficiency," "introversion," and "dominance," has been factored by Flanagan (2) into two components which together account for 96 per cent of the loadings. These have been named by the author "social maladjustment," accounting for 78 per cent and "seclusiveness," accounting for 18 per cent. Bernreuter himself had already shown that his "neurotic tendency" and "introversion" are practically identical, and that "dominance" greatly overlaps "self sufficiency." More recently Farnsworth (in an unpublished study) has found a correlation of .94 between Bernreuter's "neurotic tendency" and Flanagan's "social maladjustment." Evidently it is one thing to demonstrate the existence of a particular trait and quite another thing to name it. For the present it would be preferable

to use arbitrary symbols instead of names; the choice of the name would be much easier after thorough-going investigation of the trait's significance for the total personality in life situations.

The facts just given with respect to the Bernreuter test have been paralleled by factor analyses of other personality measures. The Strong test of occupational interests, scored by the author for some thirty different occupations, has been factored both by Thurstone (8) and by Strong (7) into four or five components. Similarly, "mental masculinity-femininity" and "interest maturity" are not to be thought of as necessarily single traits simply because they are named as though they were. These terms, however, would seem to have a special justification in the empirical procedures by which the tests in question were derived. The M-F and I-M tests are composed of items which trial has shown to yield, respectively, sex and age differences; whatever components they may have, they are in fact measures of M-F and I-M differences.

Notwithstanding the unsatisfactory status of personality measurement we have considered it worth while to ascertain what relationships, if any, the scores obtained on leading personality tests bear to marital compatibility, even if the final interpretation of such relationships should have to await further investigation. Choice of the tests to be used was based upon the known merits of tests available, on the amount of research which had been done that would aid in the interpretation of scores, and on various practical considerations such as plausibility of the tests to those taking them, time limits for testing, ease of administration, etc.

The Strong Vocational Interest Blank and the Bernreuter Personality Inventory were finally selected. The latter was scored for the four traits originally proposed by the author, although, as we have pointed out, "neurotic tendency" and "introversion" are practically identical. The Strong test yielded nine scores. Seven of these were occupational scores selected by Dr. Strong as most nearly representing interest-constellations previously disclosed by factor analysis. They include the following occupations: chemist, lawyer, life insurance salesman, teacher, Y. M. C. A. worker, general secretary, office man, certified public accountant. It is important that the reader should think of the occupational interest scores in this study not primarily as scores for interest in the seven occupations named, but as representative of constellations of interests which followers

Occupation scored	Occupations on which ratings are likely to be similar	Occupations likely to yield opposite ratings
I. Chemist	Physicist, engineer, mathematician, dentist, psychologist, architect, physician, agriculturist	Life insurance salesman, real estate salesman
IIa. Lawyer	Newspaper editor, author, advertising man	Carpenter
IIb. Life insurance salesman	Real estate salesman	Chemist, physicist, psychologist, mathematician, engineer, architect, physician
IIIa. Teacher	City school superintendent, minister, Y. M. C. A. secretary	
IIIb. Y. M. C. A. secretary	Y. M. C. A. physical director, city school superintendent, personnel manager, vacuum cleaner salesman, teacher, minister	
IV. Office man	Accountant, vacuum cleaner salesman, purchasing agent, personnel manager	Artist, journalist, physician
V. Certified public accountant	This occupation not closely correlated with any other	

Note: Similarity of interests between occupations listed in column one and occupations opposite them in column two is indicated by correlations ranging from .60 to .88; the reverse relationship between occupations in column one and column three by correlations of  $-.60$  to  $-.88$  (uncorrected for attenuation).



of these occupations express in their test responses. These constellations are indicated by the groupings given on Dr. Strong's report blank to subjects, shown on p. 146.

The other two scores yielded by the Strong test were an M-F score and an I-M score. This M-F score is not identical with that yielded by the M-F test devised by Terman in 1927-28 and extensively investigated since then by Terman and Miles, but is significantly correlated with it. For a group of 41 males the correlation between Terman and Strong M-F scores is .43, for 62 females the correlation is .62, for the two sexes combined, it is .86. The original M-F test would have been preferable, but its inclusion in the battery would have added greatly to the difficulties of the testing program. The Strong M-F score, while by no means an equivalent substitute, has enough in common with the Terman M-F score to show whether a measure of this general type is significantly related to marital compatibility. The M-F scoring key used was worked out by Dr. Harold Carter on the basis of sex differences yielded by 114 males and 114 females, chiefly of high school age. Of the 420 items in the test, 156 yielded sex differences of probably significant magnitude, and weights were assigned to these items in proportion to the magnitude of the differences found. The reliability of the resulting score is .94.

The derivation of the I-M score has been described elsewhere by Dr. Strong (7). The main point to note here is that it is based on a comparative study of the responses made on the Strong occupational interest test by two age groups, one an unselected population of 472 boys aged fifteen years, the other a group of 55-year-old men in professional and executive occupations. Strong defines interest maturity as "the degree to which one has the interests of 55-year-old men of superior education and occupational attainment in contrast to the interests of the typical 15-year-old boy."

In giving the Strong and Bernreuter tests to couples representing different degrees of marital happiness answers were sought to the following specific questions: (1) Do happily married couples resemble one another in the thirteen variables to a greater or less extent than do unhappily married or divorced couples? (2) Is the direction of husband-wife difference significant as well as the amount of difference? (3) Will analysis of responses to the 545 individual items of the two tests throw any light on marital compatibility over

and above that yielded by the trait scores? (4) Do the happily married individuals of a given sex differ as a group from the unhappily married or the divorced?

### THE SELECTION OF CRITERION GROUPS

The difficulties in the way of assigning a quantitative happiness-rating to a marriage are too obvious to dwell upon, in view of the complexity and the frequently evanescent character of the state designated as "marital happiness." No one would claim that a state dependent upon so many qualitative factors could be quantitatively assessed with any pretense to accuracy. It is only when large groups of couples are compared, groups selected as probably belonging to the extremes of the happiness distribution, that significant results can be secured. Even then the findings must be regarded as of value chiefly in showing the direction in which significant relationships are to be sought.

The procedure chosen involved a comparative study of three groups: (1) a group rated, by a method to be described, in the highest third among representative married couples with respect to marital happiness; (2) a group of married couples similarly selected as rating in the lowest third; and (3) a divorced group. These groups will be designated by the letters H, L, and D (High, Low, Divorced). The data to be reported are based upon 100 couples belonging to each of the three groups, or a total of 600 subjects. The three groups were equated as nearly as possible for age, education, occupational status, and environmental background.<sup>3</sup>

It would be absurd to assume that on a true measure of marital happiness these groups would be found non-overlapping. Some of the divorced couples were probably less unhappy than many of the couples who are still married. One must also bear in mind that some of the marriages rated in this study as happy may later become unhappy, possibly even to the point of separation and divorce. For our results to be valid it is only necessary to assume that the true mean of marital happiness in the H group is well above that in the L or D groups.

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<sup>3</sup>The original plan called for 200 divorced couples, but the task of securing data was so time-consuming and expensive that the number had to be reduced.

## SELECTION AND TESTING OF SUBJECTS

The nature of the tests used precluded any attempt to obtain truly representative samples of the generality of divorced and married couples in the localities where the data were gathered. Effort was made, however, to secure a sampling as nearly as possible representative of those who had received at least one year of high school education or its equivalent. The study was further limited to American-born whites not over 60 years of age. Details with regard to composition of the groups will be found in Tables 1, 2,

TABLE 1  
DISTRIBUTION OF HUSBANDS' OCCUPATIONS

Goodenough Occupational Scale	High	Low	Divorced
I	27	29	27
II	35	33	33
III	18	17	22
IV	—	3	1
V	15	15	12
VI	3	2	4
VII	2	1	1
Total*	100	100	100

\*In all there were 104 specific occupations given by the 300 men. A tabulation of these (not here reproduced) disclosed no undue loading of either the H, L, or D group with any particular type of occupations.

TABLE 2  
DISTRIBUTION OF AGES

Ages	Husbands			Wives		
	High	Low	Divorced	High	Low	Divorced
20-24	4	3	2	2	10	8
25-29	7	11	12	18	13	21
30-34	23	19	26	22	18	28
35-39	18	25	22	29	32	16
40-44	23	20	14	13	15	13
45-49	13	11	13	9	7	11
50-54	6	9	5	3	2	1
55-59	5	2	5	3	3	1
60-64	1	—	1	1	—	1
Total	100	100	100	100	100	100
Mean	39.39	38.39	38.37	36.54	35.46	34.52
$\sigma$	8.83	8.04	8.54	8.08	8.07	8.09

TABLE 3  
DISTRIBUTION OF SCHOOLING

Grade completed	Husbands			Wives		
	High	Low	Divorced	High	Low	Divorced
High school I (or less)	10	9	11	4	7	6
High school II	6	11	11	11	7	7
High school III	6	6	3	6	5	5
High school IV	19	12	16	26	23	28
College I	6	8	5	4	8	8
College II	5	4	10	13	20	8
College III	9	7	6	8	7	6
College IV	25	25	28	21	18	20
Beyond college IV	14	18	10	7	5	12
Total	100	100	100	100	100	100
Mean (years above eighth grade)	5.65	5.72	5.41	5.33	5.26	5.45
$\sigma$	2.66	2.82	2.70	2.73	2.28	2.44

and 3. The fairness of the sampling within the limits set cannot be guaranteed, but this is less important than that the three groups should be well matched for factors that might influence responses. An examination of the tables will show that the latter criterion has been reasonably well satisfied.

Work began with tests of divorced couples, as it was foreseen that the greater number and accessibility of test-willing married couples would make it easier to match a divorced group with a married group than to proceed in the other direction. First of all, court records of divorces granted in Santa Clara County, California, were scanned from 1933 back to 1930, and American-sounding names of those to whom divorces had been granted were taken for follow-up. Names which appeared to be of Italian, Spanish, Portuguese, or Mexican origin were discarded. Telephone books, city directories, and other sources of information were then utilized in the effort to contact at least one member of the divorced couple. This was possible in about 35 per cent of cases (loss of 65 per cent). After contact was made the numbers were further reduced by the educational requirement (loss of 10 per cent), by inability to contact more than one member of the divorced couple (loss of 15 per cent), and by the refusal of one or both to cooperate (loss of 6 per cent). The court files of 700 divorces yielded complete data for only 26 couples (less than 4 per cent) and to secure this small amount of data cost the time of a capable field assistant for two months, hun-



dreds of home and office visitations, and over two thousand miles of travel by automobile and train. Later, divorced subjects were located in Palo Alto and in the Bay region of California by the help of friends, lawyers who had been employed in divorce cases, ministers, and others. These yielded a smaller proportion of losses incident to the educational requirement and failure to locate subjects. The most serious weakness of the sampling of divorced couples, apart from the limited size of the group, must be charged to refusal to cooperate. Of 180 couples contacted who satisfied the requirements of education, nationality, and age, complete data were secured for 116 couples, or approximately 65 per cent. Because of the difficulties of group matching, and also for the sake of round numbers, the number was later reduced to 100 couples.

A much more efficient procedure was possible in testing married couples. In his studies of later maturity Miles (5) found that it was easy to secure the cooperation of a large proportion of the available population by the simple device of paying a small sum of money to some organization with which the testee was connected. This was the method used in the present experiment. Organizations of many kinds between San Jose and Redwood City, California, were canvassed by field assistants. As practically all organizations are constantly in need of funds for one purpose or another, it was possible to secure the hearty cooperation of their officers on the agreement to pay one dollar into their treasuries for each married couple among their members or relatives who filled out the blanks. In each case an estimate of the number of couples who would probably cooperate was made by an officer of the organization, who distributed the test blanks to members indicating their willingness to fill them out. Table 4 gives some indication of the nature of the sampling and of the heartiness of cooperation.

In addition to the above total of 334 couples, miscellaneous couples to the number of 11 also took the tests, making in all 345 married couples. In most of our comparisons only 200 of these have been used: 100 of the most happily and 100 of the least happily married as judged by information anonymously furnished by the subjects on a separate blank designed to yield a rating on marital happiness. Since only 200 of the 345 couples were included in the group comparisons, it was possible, as we have seen, to match the three groups fairly closely.

TABLE 4  
SOURCES OF DATA FOR MARRIED COUPLES

Name of organization	Couples given blanks	Couples completing blanks
1. Seventh Day Adventist Church, Palo Alto	10	10
2. Baptist Church, Palo Alto	29	24
3. Eulexia Club, Palo Alto	50	42
4. Junior Auxiliary, Episcopal Church, Palo Alto	50	32
5. Girl Scout Council, Palo Alto	89	56
6. Peninsula School, Ltd., Menlo	83	38
7. Plymouth Guild, Congregational Church, Redwood City	25	13
8. Baptist Church, Redwood City	25	23
9. Presbyterian Church, Mountain View	25	25
10. Triangle Club, Seventh Day Adventist, Mountain View	25	25
11. P. E. O. Lodge, Mountain View	10	10
12. First Congregational Church, San Jose	15	10
13. Beratheia Class, M. E. Sunday School, San Jose	15	11
14. Ladies Aid Society, Napa	15	15
Total	466	334

#### CONDITIONS OF TESTING

In the large majority of cases it was not possible to have the subjects tested under supervision. The usual method pursued was to leave blanks and stamped return envelope with those who had promised to cooperate, with instructions to answer all the questions without conferring with anyone and to mail them to Dr. Terman. The tests used are such as do not require supervision while being taken, provided the testee can be depended upon to regard the task seriously and to answer the questions truthfully. Earnest effort was made to insure these conditions. Even those subjects who expressed doubt as to the value of the study gave every evidence of earnest cooperation in filling the blanks.

The most serious danger feared was that some of the subjects would fill out the blanks in consultation with another person, more probably the spouse. Emphatic warning against this was included in the instructions and promise was exacted from subjects that they would not even permit the spouse (or divorced spouse) to see the

blank after it had been filled out. As far as the divorced couples are concerned we can be certain that there were very few if any cases of collaboration. A majority of the divorced subjects indeed were especially anxious to make sure that the former spouse should not be permitted to see their responses, and a large proportion of the divorced could not have collaborated if they had wanted to. The evidence against collaboration on the part of the married couples is indirect but reassuring; it will be found in later sections dealing with comparisons of the three groups: (*a*) with respect to mean scores in the thirteen variables, (*b*) with respect to spouse-spouse correlations in these variables, and (*c*) with respect to tetrachoric correlations between spouses (or ex-spouses) on the 545 individual items. There are several ways in which these three sets of data would have been affected if the married couples had collaborated more frequently than the divorced couples. Scrutiny of the data has disclosed no evidence of such influence, and since we are certain that there was little if any collaboration among the divorced, we are convinced that the data for the married couples are relatively free from this possible source of vitiation. The spouse-spouse correlations are especially in point, as is also the consistency of the resemblances and differences between the unhappily married and the divorced groups in their divergences from the happily married group.

#### DERIVATION OF RATINGS ON MARITAL HAPPINESS

Who is wise enough to say what constitutes a "happy" marriage? There are so many kinds of happiness and unhappiness incident to marriage that no weighing in the balance of one kind against another can do justice to the complex emotional facts in question. Perhaps the vast majority of marriages are neither entirely happy nor entirely unhappy, and the extent to which a particular form of happiness offsets a particular form of unhappiness must be largely a personal matter. Nevertheless, all will admit that some marriages are actually more happy than others. It is an empirical undertaking to find out what circumstances are most frequently discoverable in marriages which are characterized by the marital partners as exceptionally happy or exceptionally unhappy.

Valuable information of the kind in question has been assembled by many investigators, notably by Davis (1) and Hamilton (3). Hamilton's study is especially notable for its breadth of conception,

ingenuity employed in securing intimate details of sex histories, and the quantity of factual data made available for correlation with estimates of marital happiness.

There is little overlap between Hamilton's study and the present one, for aside from the fact that the former is concerned primarily with sexual histories and the latter with personality traits, Hamilton's method of estimating the marital happiness of his subjects was admittedly (and pardonably) rough. Fortunately, before the present study was under way, and at the time when possible methods of rating success in marriage were under consideration, a news item brought information of an unfinished investigation of this problem by Professor E. W. Burgess of the University of Chicago. Professor Burgess kindly placed at our disposal an extensive protocol of his questions on which data had been collected for hundreds of persons either happily or unhappily married, and later a list of those questions in his series which had been found to yield data correlated with marital happiness. These questions were separately printed as a four-page blank which was filled out anonymously by all our married subjects, both husbands and wives, and returned in the same sealed envelope which contained their completed test blanks. The "Marriage Blank" is here reproduced, in reduced type.

#### MARRIAGE STUDY

We are trying to learn more about factors which make for happy and unhappy marriages. To do this we need the cooperation and assistance of a great many married people, people whose marriages are very happy or whose marriages are only moderately satisfactory, as well as people whose marriages are unsatisfactory.

We are asking both husband and wife in each married couple to answer the following questions in addition to those contained in the Bernreuter Personality Inventory and the Strong Vocational Interest Blank.

*Please do not hesitate to be perfectly frank. You will note that this blank does not call for any signature and that practically all of the questions can be answered by a check mark. As soon as the blank has been received it will be placed in a special file separate from the other two blanks you have filled out. Your identity will therefore not be known to the assistant who tabulates the answers. Moreover, I pledge my word of honor*



*to destroy the blank as soon as the tabulations have been completed.*

Husband and wife should fill out all the blanks in private. Neither should confer with the other in answering any of the questions whatever, or show the other his (or her) answers. Each should seal and mail the three blanks in the accompanying envelope as soon as they have been filled out.

LEWIS M. TERMAN,  
Department of Psychology  
Stanford University, California.

This blank was filled out by: (check) husband....; wife....  
Date.....

### 1. THE MARRIAGE

1. Date of marriage: year.... Age of husband at marriage ....; of wife ....
2. Number of children born to couple .... Did husband want children?....; did wife? .... If no children, does husband want children?....; does wife?....
3. Do husband and wife engage in outside interests together? (check) All of them ....; some of them ....; very few of them ....; none of them ....
- 4a. State approximate extent of agreement or disagreement on following items: (Please place a check opposite every item.) [Blank given on p. 156.]
- 4b. Specify other matters of disagreement .....
- 4c. When disagreements arise, they usually result in: (check) husband giving in ....; wife giving in ....; agreement by mutual give and take .....
5. Do you ever wish you had not married? (check) Frequently ....; occasionally ....; rarely ....; never ....
6. If you had your life to live over do you think you would: (check) marry the same person ....; marry a different person ....; not marry at all ....?
7. What things annoy and dissatisfy you most about your marriage? .....
8. What things does your husband (wife) do that you don't like? .....

Check one column for each item below	Always agree	Almost always agree	Occasionally disagree	Frequently disagree	Almost always disagree	Always disagree
Handling family finances	.....	.....	.....	.....	.....	.....
Matters of recreation ..	.....	.....	.....	.....	.....	.....
Religious matters .....	.....	.....	.....	.....	.....	.....
Demonstrations of affection .....	.....	.....	.....	.....	.....	.....
Friends .....	.....	.....	.....	.....	.....	.....
Intimate relations .....	.....	.....	.....	.....	.....	.....
Caring for the children ..	.....	.....	.....	.....	.....	.....
Table manners .....	.....	.....	.....	.....	.....	.....
Matters of conventional- ity .....	.....	.....	.....	.....	.....	.....
Philosophy of life .....	.....	.....	.....	.....	.....	.....
Ways of dealing with in- laws .....	.....	.....	.....	.....	.....	.....

9. Have you ever contemplated separation? (check) yes ....; no .... Divorce? Yes ....; no ....
10. Appraisal of marriage: (check) very unhappy ....; unhappy ....; average ....; happy ....; very happy ....

## II. THE HUSBAND AND HIS PARENTS

1. Draw a circle around the highest school grade completed by the husband: Grades 1, 2, 3, 4, 5, 6, 7, 8; High School 1, 2, 3, 4; College 1, 2, 3, 4.  
Number of years beyond college in graduate or professional study .....  
Training for what profession .....
2. Marital happiness of husband's parents: (check) marriage was very happy ....; happy ....; average ....; unhappy ....; very unhappy ....
3. Amount of conflict (before marriage) between husband and his father: (check) none ....; very little ....; moderate ....; a good deal ....; almost continuous conflict .....
4. Amount of attachment (before marriage) between husband and his father: (check) none ....; very little ....; moderate ....; a good deal ....; very close .....
5. Amount of conflict (before marriage) between husband and his mother: (check) none ....; very little ....; moderate ....; a good deal ....; almost continuous conflict .....
6. Amount of attachment (before marriage) between husband and his mother: (check) none ....; very little ....; moderate ....; a good deal ....; very close .....

## III. THE WIFE AND HER PARENTS

1. Draw a circle around the highest school grade completed by the wife: Grades 1, 2, 3, 4, 5, 6, 7, 8; High School 1, 2, 3, 4; College 1, 2, 3, 4.  
Number of years beyond college in graduate or professional study ....  
Training for what profession .....
2. Marital happiness of wife's parents: (check) marriage was very happy ....; happy ....; average ....; unhappy ....; very unhappy ....
3. Amount of conflict (before marriage) between wife and her father: (check) none ....; very little ....; moderate ....; a good deal ....; almost continuous conflict .....

4. Amount of attachment (before marriage) between wife and her father: (check) none ....; very little ....; moderate ....; a good deal ....; very close ....
5. Amount of conflict (before marriage) between wife and her mother: (check) none ....; very little ....; moderate ....; a good deal ....; almost continuous conflict .....
6. Amount of attachment (before marriage) between wife and her mother: (check) none ....; very little ....; moderate ....; a good deal ....; very close .....

The happiness rating was based upon the responses to items 3 to 10 in Part I. The weights to be assigned to the separate items in deriving a total happiness score naturally offered a difficult problem. It will be noted that all the items except the last, No. 10, call for information which may be characterized as factual rather than subjective, although the responses to these items are also more or less open to influence by subjective factors. The last item, however, calls for an appraisal which is primarily subjective. The evidence it yields has the advantage of being direct and to the point, but the disadvantage that it is not only subjective, but also more likely to be affected by wishful thinking or even intentional misstatement (in case there was any doubt in the subject's mind as to the anonymity of response). Moreover, it undoubtedly suffers from the elements of unreliability known to inhere in all rating devices. For these reasons it was deemed best to give item 10 only a moderate weight in the entire scheme and to make the total happiness score largely a summation of the more concrete factual data. The weights finally assigned to the various responses on the blank were as follows:

*Item 3.* Do husband and wife engage in outside interests together? All, 6; some, 4; very few, 2; none, 0.

*Item 4a.* Agreement on 11 items. The degrees of agreement on the 11 items were averaged for each individual, and these averages were converted into units of a normal distribution ranging from 1 (highest agreement) to 9 (greatest disagreement). Average agreement of 1 was assigned the weight 8, average agreement of 2 the weight 7, and so on to average agreement of 9, which was given a weight of 0.

*Items 4b, 7, and 8.* Number of dissatisfactions. The number of dissatisfactions, annoyances, etc., were added together and weight

of 3 was given for none, 2 for one or two, 1 for three to five, and 0 for six or more.

*Item 4c.* Settlement of disagreements. Weight of 3 was assigned for "mutual give and take," 1 for "spouse gives in," 0 for "self gives in."

*Item 5.* Do you ever wish you had not married? Never, 9; rarely, 6; occasionally, 3; frequently, 0.

*Item 6.* If you had your life to live over? Would marry the same person, 9; different person, 0; not marry at all, 0.

*Item 9.* Have you ever contemplated separation or divorce? No, 9; yes (if subject checks either separation or divorce), 0.

*Item 10.* Appraisal of marriage. Very happy, 15; happy, 10; average, 5; unhappy, 0; very unhappy, 0.

The weighting scheme used is to a certain extent arbitrary and perhaps no better than others which could have been devised. The ideal weighting of the sub-tests of a battery is the one which will yield the highest multiple correlation between total test score and an independently determined criterion of the trait in question. In the present instance this method could not be used, as no outside criterion of marital happiness was available. The procedure adopted follows the principle of internal consistency, which has been extensively used in the construction of personality trait scales. This criterion is based on the assumption that tests items which are valid indices of the sought-for trait will show positive intercorrelation. Burgess' research had disclosed that items 4a, 4b-7-8, 5, 6, 9, and 10 were particularly promising indicators of marital happiness. The intercorrelations of these items, and the correlations of each with the remaining items of the test were accordingly computed for the first 317 couples who had returned completely filled blanks. The items 1a (date of marriage), 1b (age of husband at marriage), 1c (age of wife at marriage), 2a (children born to couple), 2b (desire for children) showed low and in some cases negative relationships with the remaining items of the blank. The responses to these items were accordingly given no weight in deriving the marital happiness score. The items from 3 to 10 were assigned the weights indicated above on the basis of magnitude of their intercorrelations and their husband-wife correlations. The maximum happiness score obtainable was 62.



TABLE 5  
INTERCORRELATIONS OF MARRIAGE BLANK ITEMS

	1a	1b	1c	2a	2b	3	4a	4b,7,8	4c	5	6	9	10
1a == Years married													
1b == Age at marriage													
1c == Husband-wife age difference													
2a == Number of children													
2b == Desire for children													
3 == Interests in common													
4a == Av. agreement—11 items													
4b, 7 8 == No. of dissatisfactions													
4c == Settlement of disagreements													
5 == Wish had not married													
6 == Choice if life to live over													
9 == Separation or divorce													
10 == Appraisal of marriage													

Letter following correlation indicates how computed: p = Pearson product moment  $r$ ; b = bi-serial  $r$ ; t = tetrachoric  $r$ ; ( ) indicate husband-wife  $r$ 's for item in question.

1a	— .02p	— .11p	— .003p	— .07p			— .02p	— .16p		.02b	— .06b	.20b	— .09b
1b	— .16p	— .07p	.04p	— .03p			— .11p	— .07p		.10b	.07b	.12b	.09b
1c							— .003p	.04p		.03b	— .03b	.10b	.01b
2a							— .07p	— .03p		.01b	.01b	— .14b	— .01b
2b					(.86t)		.14b	.11b		.18t	.25t	.24t	.10t
3						(.70t)	.52b	.16b		.57t	.46t	.51t	.52t
4a					.14b	.52b	(.53p)	.40p	.45b	.68b	.57b	.51b	.60b
4b, 7, 8					.11b	.16b	.40p	(.34p)	.42b	.41b	.51b	.50b	.52b
4c							.45b	.42b	(.42t)	.45t	.51t	.44t	.49t
5	.02b	.10b	.03b	.01b	.18t	.57t	.68b	.41b	.43t	(.57t)	.87t	.63t	.78t
6	— .06b	.07b	— .03b	.01b	.25t	.46t	.57b	.51b	.51t	.87t	(.51t)	.51t	.71t
9	.20b	.12b	.10b	— .14b	.24t	.51t	.51b	.50b	.44t	.63t	.51t	(.77t)	.70t
10	— .09b	.09b	.01b	— .01b	.10t	.52t	.60b	.52b	.49t	.78t	.71t	.70t	(.65t)

TABLE 6  
[INTERCORRELATIONS OF MARRIAGE BLANK ITEMS  
Wives' answers (N = 317)]

1a = Years married  
1b = Age at marriage  
1c = Husband-wife age difference  
2a = Number of children  
2b = Desire for children  
3 = Interests in common  
4a = Av. agreement—11 items  
4b, 7, 8 = No. of dissatisfactions  
4c = Settlement of disagreements  
5 = Wish had not married  
6 = Choice if life to live over  
9 = Separation or divorce  
10 = Appraisal of marriage

Letter following correlation indicates how computed: p = Pearson product moment  $r$ ; b = bi-serial  $r$ ; t = tetrachoric  $r$ ; ( ) indicate husband-wife  $r$ 's for item in question.

	1a	1b	1c	2a	2b	3	4a	4b,7,8	4c	5	6	9	10
1a													
1b							.02p	-.11p	.04b	-.06b	.13b	-.07b	
1c							-.12p	-.01p	.05b	.05b	.23b	.15b	
2a							.003p	.05p	.12b	-.01b	.15b	.09b	
2b							.03p	-.06p	-.09b	-.26b	-.09b	-.11b	
3					(.86t)		-.05b	-.05b	-.13t	-.28t	-.08t	-.02t	
4a						(.70t)	.39b	.19b	.42t	.47t	.35t	.61t	
4b, 7, 8	.02p	-.12p	.003p	.03p	-.05b	.39b	(.53p)	.36p	.60b	.51b	.55b	.68b	
4c	-.11p	-.01p	.05p	-.06p	-.05b	.19b	.36p	(.34p)	.17b	.46b	.52b	.50b	.44b
5		.04b	.12b	-.09b	-.13t	.42t	.28b	.17b	(.42t)	.43t	.42t	.32t	.29t
6	-.06b	.05b	-.01b	-.26b	-.28t	.47t	.60b	.46b	.43t	(.57t)	.87t	.58t	.72t
9	.13b	.23b	.15b	-.09b	-.08t	.35t	.51b	.52b	.42t	.87t	(.51t)	.56t	.82t
10	-.07b	.15b	.09b	-.11b	-.02t	.61t	.55b	.50b	.32t	.58t	.56t	(.77t)	.68t
							.68b	.44b	.29t	.72t	.82t	.68t	(.65t)

Table 5 gives the intercorrelations of the items for husbands and Table 6 the intercorrelations for wives. Table 7 gives the distributions of total happiness scores of husbands and wives, separately, and Table 8 the distribution of the combined happiness scores of the 345 couples.

TABLE 7  
DISTRIBUTION OF TOTAL HAPPINESS SCORES  
(N = 345)

Score	Husbands	Wives
59-62	40	28
55-58	64	77
51-54	60	58
47-50	44	50
43-46	31	28
39-42	28	20
35-38	17	20
31-34	14	20
27-30	15	13
23-26	12	9
19-22	5	7
15-18	8	5
11-14	1	3
7-10	3	1
3- 6	2	4
0- 2	1	2
Mean	46.2	46.4
$\sigma$	12.4	12.7

TABLE 8  
DISTRIBUTION OF TOTAL HAPPINESS SCORES, HUSBANDS AND WIVES COMBINED  
(N = 345)

Score	Total
117-124	22
109-116	76
101-108	61
93-100	42
85- 92	37
77- 84	24
69- 76	25
61- 68	16
53- 60	23
45- 52	6
37- 44	5
29- 36	2
21- 28	2
13- 20	2
5- 12	2
Mean	92.7
$\sigma$	22.5

It is interesting to note the amount of agreement between spouses in their responses on the Marriage Blank. Both Table 5 and Table 6 give the husband-wife correlations on the items 2b to 10, inclusive. These range from .34 (for number of dissatisfactions mentioned) to .86 (for desire for children). The correlation is only .42 on manner of settling disagreements, as both husband and wife frequently claimed to be the one who "gave in." The husband-wife correlation is .70 for item 3 (interests in common), and .77 for item 9 (separation or divorce considered). Item 10 (general appraisal of marital happiness) gives a husband-wife correlation of .65. Total scores on marital happiness (Table 7) yield almost identical means and standard deviations for husbands and wives, and the husband-wife correlation for total happiness score is  $.605 \pm .023$ .

Not all of the correlations in the preceding paragraph are to be thought of as reliability coefficients. They may be considered as such only in the case of item 3 (interests in common), item 4a (average agreement on 11 topics), and item 4c (method of settling disagreements). The other items call for data which could not be expected to be always the same for husband and wife; e.g., degree of happiness experienced, number of dissatisfactions, regret over marriage, etc.

#### ITEM SUMMARY OF MARRIAGE BLANK

*Item 1b: Age at Marriage.* Husbands: N 344, M 27.69,  $\sigma$  5.32. Wives: N 344, M 24.54,  $\sigma$  4.44. Correlation of combined happiness score (CHS) with husband's age at marriage,  $.099 \pm .036$ ; with wife's age at marriage,  $-.132 \pm .036$ . On the basis of these figures one would have to conclude that age at marriage is an extremely small factor in marital happiness.

*Item 1c: Age Difference between Spouses.* The differences ranged from husband 7 years younger (one case) to 15 or more years older (three cases). The median difference, signs regarded, was husband 2.24 years older, with  $Q_1$  at husband .38 year older and  $Q_3$  at husband 5.14 years older. Correlation between age difference and CHS was  $.045 \pm .036$ . One would like to know whether this lack of relationship would be found for larger age differences and with much older groups. The lack of correlation found strongly challenges popular opinion on the question.

*Item 2a: Number of Children Born to Couple.* The correlation

(product-moment) between number of children and CHS was  $-.076 \pm .036$ ; the tetrachoric correlation between the presence or absence of children and CHS was  $-.13$ . There was no significant difference between mean number of children for the 100 most happy and the 100 least happy matched couples. Although the presence of children may render divorce less likely, it appears to have no effect upon marital happiness.

*Item 2b: Desire for Children.* Neither the responses of husbands nor of wives, considered separately, showed any correlation with CHS. On the other hand, there was a tetrachoric correlation of  $.37$  between CHS and husband-wife *agreement* in wanting or not wanting children.

*Item 3: Outside Interests in Common.* The significant relationship of this item to marital happiness is indicated by the following

TABLE 9  
AMOUNT OF AGREEMENT AND DISAGREEMENT

	Family finances				Recreation				Religion			
	Husbands		Wives		Husbands		Wives		Husbands		Wives	
	H	L	H	L	H	L	H	L	H	L	H	L
1. Always agree	46	15	52	17	43	5	38	9	61	30	54	33
2. Almost always agree	41	46	38	47	46	45	50	46	28	37	33	37
3. Occasionally disagree	11	26	8	23	10	31	12	32	10	20	11	13
4. Frequently disagree	2	5	2	8	—	14	—	8	1	7	1	9
5. Almost always disagree	—	7	—	3	—	3	—	4	—	2	1	3
6. Always disagree	—	1	—	2	—	—	—	—	—	3	—	4
No answer	—	—	—	—	1	2	—	1	—	1	—	1

	Demonstrations of affection				Friends				Intimate relations			
	Husbands		Wives		Husbands		Wives		Husbands		Wives	
	H	L	H	L	H	L	H	L	H	L	H	L
1. Always agree	59	11	60	15	45	11	45	11	48	13	55	15
2. Almost always agree	35	36	33	39	41	46	40	44	42	40	35	35
3. Occasionally disagree	5	38	6	26	12	28	15	28	10	26	9	34
4. Frequently disagree	—	10	1	11	1	10	—	3	—	12	1	9
5. Almost always disagree	—	3	—	6	—	4	—	2	—	7	—	4
6. Always disagree	—	2	—	1	—	—	—	—	—	1	—	2
No answer	1	—	—	2	1	1	—	2	—	1	—	1



TABLE 9 (Continued)

	Care of children				Table manners				Conventionality			
	Husbands		Wives		Husbands		Wives		Husbands		Wives	
	H	L	H	L	H	L	H	L	H	L	H	L
1. Always agree	49	14	35	16	55	24	54	30	47	14	41	18
2. Almost always agree	29	36	32	34	35	40	33	40	40	38	40	34
3. Occasionally disagree	8	21	17	21	6	29	9	20	12	32	16	32
4. Frequently disagree	—	13	—	13	—	2	3	8	—	13	1	11
5. Almost always disagree	—	2	—	3	—	2	—	2	—	1	—	2
6. Always disagree	—	—	—	—	—	—	—	—	—	1	—	—
No answer	14	14	16	13	4	3	1	—	1	1	2	3

	Philosophy of life				In-laws			
	Husbands		Wives		Husbands		Wives	
	H	L	H	L	H	L	H	L
1. Always agree	57	13	46	14	57	23	56	25
2. Almost always agree	30	37	40	26	36	40	31	39
3. Occasionally disagree	9	33	12	38	6	25	12	22
4. Frequently disagree	—	8	—	14	—	6	—	12
5. Almost always disagree	—	4	—	4	—	2	—	1
6. Always disagree	4	4	2	1	1	1	1	—
No answer	—	1	—	3	—	3	—	1

figures for the matched groups of 100 most happy and 100 least happy couples (H and L groups).

	Husbands		Wives	
	H	L	H	L
All of them	31	10	30	10
Some of them	65	60	65	68
Very few of them	3	22	5	15
None of them	—	8	—	7

*Item 4a: Agreement on Eleven Points.* Table 9 shows for the matched H and L groups the extent of agreement reported by both husbands and wives on eleven items of the marital happiness blank. Table 10 gives the average agreement on all eleven items.

One finds a marked difference between the H and L groups on amount of spouse agreement. The difference is so consistent for the various items as to suggest a halo effect in the responses, for it hardly seems reasonable that in actual life the eleven factors would be almost equally related to marital happiness.

TABLE 10  
AVERAGE OF AGREEMENT ON ELEVEN ITEMS

	Husbands			Wives		
	Total group N=317	H N=100	L N=100	Total group N=317	H N=100	L N=100
1. (= High agreement)	15	12	1	16	14	—
2.	19	15	3	15	9	1
3.	35	17	—	30	9	—
4.	52	20	5	57	24	11
5.	79	23	21	84	33	19
6.	47	11	17	47	3	16
7.	37	2	25	35	6	22
8.	19	—	17	18	2	17
9. (= Low agreement)	14	—	11	15	—	14

*Item 4b: Settlement of Disagreements.* The following figures summarize the data for the H and L groups:

	Husbands		Wives	
	H	L	H	L
Husband gives in	4	27	6	6
Wife gives in	4	6	6	17
Give and take	92	66	87	74

It will be noted that both H-husbands and H-wives more frequently report settlement of disagreements by "mutual give and take," and that in disagreements not so adjusted each spouse usually claims the credit for giving in.

*Item 5: Regretting Marriage.* The responses were as follows:

	Husbands		Wives	
	H	L	H	L
Frequently	—	10	—	7
Occasionally	1	31	1	33
Rarely	10	39	8	39
Never	89	20	91	19

*Item 6: "Would You Marry the Same Person?"* The figures are:

	Husbands		Wives	
	H	L	H	L
Same person	99	57	99	57
Different person	—	27	1	26
Not marry at all	1	15	—	13

*Items 7, 8, and 4b: Matters of Disagreement or Annoyance.* The things mentioned by the subjects as sources of disagreement or annoyance were merely summed; no attempt was made to assign weights according to degree of apparent seriousness. Table 11 gives the

TABLE 11  
THINGS MENTIONED AS SOURCES OF DISAGREEMENT OR ANNOYANCE

	Husbands			Wives		
	Total group	H	L	Total group	H	L
	N=317	N=100	N=100	N=317	N=100	N=100
Nothing specified	101	49	15	56	28	8
1 thing mentioned	87	30	21	62	28	10
2 things mentioned	80	17	31	102	27	31
3 " "	26	4	18	54	10	23
4 " "	12	—	7	20	5	11
5 " "	4	—	2	11	1	8
6 " "	3	—	2	4	—	3
7 " "	2	—	2	4	—	4
8 " " or more	2	—	2	4	1	2

results for the entire married group as well as for the matched H and L couples.

*Item 9: Separation or Divorce Considered.* The responses were classified as *yes* if either separation or divorce had been considered; as *no* if neither has been considered.

	Husbands		Wives	
	H	L	H	L
Yes	—	40	1	51
No	100	60	99	49

*Item 10: General Appraisal of the Marriage.* The responses to this item were heavily bunched toward the "happy" end of the distribution. Very few even of the L group, husbands or wives, rated the marriage as less happy than "average." It is not known whether this is due to avoidance of complete frankness in answering so personal a question, to a general pessimism about marriage engendered by their own unhappiness, or to a Freudian "projection" tendency. The distributions of ratings both for the total group and for the H and L groups are given in Table 12.

TABLE 12  
APPRAISAL OF MARRIAGE

	Husbands			Wives		
	Total group	H	L	Total group	H	L
	N=317	N=100	N=100	N=317	N=100	N=100
Very unhappy	3	—	1	3	—	2
Unhappy	6	—	4	8	—	7
Average	69	—	52	62	1	46
Happy	117	25	34	110	19	39
Very happy	148	74	9	160	80	5
No answer	1	1	—	1	—	1

TABLE 13  
MARITAL HAPPINESS OF SPOUSES' PARENTS

	N	Very happy 1	Happy 2	Average 3	Unhappy 4	Very unhappy 5	Mean
Husbands' parents:							
H group	98	30	33	25	5	5	2.20
L group	100	19	31	37	8	5	2.49 (less happy)
Wives' parents:							
H group	99	32	25	26	11	5	2.31
L group	97	14	26	41	10	6	2.67 (less happy)
Husbands' + wives' parents combined:							
H group	197	62	58	51	16	10	2.26
L group	197	33	57	78	18	11	2.58 (less happy)

## SPOUSE-PARENT RELATIONSHIPS

It will be recalled that each spouse rated the happiness of his (or her) parents' marriage and also the amount of respondent's attachment to and conflict with each parent. Table 13 summarizes the ratings on marital happiness of the parents. It would seem from this table that happy marriages show a significant tendency to run in families. Table 14 shows that the chances of happiness in mar-

TABLE 14

EXTREME RATINGS ON MARITAL HAPPINESS OF PARENTS IN RELATION TO MARITAL HAPPINESS OF OFFSPRING

	Couples in H group	Couples in L group
Marital happiness of parents:	N=98	N=97
Above average for both spouses	40	23
Above average for husband, below average for wife	23	27
Below average for husband, above average for wife	17	17
Below average for both spouses	18	30

riage are distinctly better if the parents of both spouses were happy than if the parents of only one were happy, and very much better than if both sets of parents were unhappy. The reader will make his own choice between a biological and a sociological explanation.

Table 15 summarizes the data on spouse-parent attachments and conflicts. This table is of special interest in connection with Freudian theory. Undue attachment to the opposite-sex parent is supposed to give rise to an "incest barrier" which has the ultimate effect of inhibiting impulses to heterosexual behavior. Another alleged outcome of such attachment is the child's jealousy of the same-sex parent and the development of antagonism and conflict between the two. Excessive attachment to the same-sex parent is also believed to endanger heterosexual development and to cause conflict between the child and the opposite-sex parent. That is, persistence of any strong parent-child attachment is looked upon as a threat to the child's later marital adjustments.

Whatever mechanisms one may posit with respect to the effects of parent-child relations, there is little evidence in Table 15 that these have any appreciable influence upon marital happiness. Even the extreme cases of attachment and conflict fail to support psycho-



TABLE 15  
PARENT ATTACHMENTS AND CONFLICTS IN H AND L GROUPS

		Degree specified, from none (1) to greatest (5)							Diff. $\sigma_{diff.}$
		N	1	2	3	4	5	Mean	
Husbands									
Father conflict	H	96	50	35	6	4	1	1.66	-1.46
	L	100	47	30	14	9	0	1.85	
Father attachment	H	95	5	3	32	35	20	3.65	1.34
	L	99	3	13	38	26	19	3.47	
Mother conflict	H	99	59	27	10	3	0	1.57	-2.08
	L	99	44	35	15	4	1	1.82	
Mother attachment	H	99	2	3	22	32	40	4.06	1.24
	L	98	1	3	29	37	28	3.90	
Wives									
Father conflict	H	95	48	23	16	8	0	1.83	-1.12
	L	96	34	40	13	7	2	1.99	
Father attachment	H	96	4	5	33	28	25	3.65	1.09
	L	94	4	11	34	30	15	3.44	
Mother conflict	H	96	45	33	9	6	3	1.84	-2.07
	L	93	28	38	15	8	4	2.16	
Mother attachment	H	94	2	6	16	32	38	4.04	1.18
	L	92	2	4	24	36	26	3.87	
Husbands and wives combined									
Father conflict	H	191	98	58	22	12	1	1.74	-1.82
	L	196	81	70	27	16	2	1.96	
Father attachment	H	191	9	8	65	64	45	3.65	1.69
	L	193	7	24	72	56	34	3.45	
Mother conflict	H	195	104	60	19	9	3	1.70	-2.84
	L	192	72	63	30	12	5	1.98	
Mother attachment	H	193	4	9	38	64	78	4.05	1.65
	L	190	3	7	53	73	54	3.89	

analytic theory. The conclusion must be either that the theory lacks foundation or that a questionnaire of the type used in this study fails to obtain the facts it seeks to uncover. The latter ex-

planation is conceivably the correct one. It might be argued that parent-child relationships become so overlaid by rationalization and compensatory phenomena that the true facts can only be brought to light by psychoanalytic procedures, never by casual questioning. We do not feel competent to pass on this point, but would venture two alternative explanations.

The essential fact to be explained is why happily married persons, both men and women, report more attachment for and less conflict with both their parents than are reported by the unhappily married. It seems to us that the most reasonable explanation is that members of the H group are by inherited or early-acquired disposition a little more amiable and affectionate, on the average, than the members of the L group. This disposition would account for the satisfactory relationship both with parents and with spouse.

Another possible explanation is that the mere fact of present marital happiness or unhappiness tends to affect the subject's report of his relations to his parents, favorably if he is happy, unfavorably if he is unhappy, as though these states were colored glasses lending their own distinctive hues to whatever is seen through them. However, this explanation seems to us less plausible than the preceding one. It could be as reasonably argued that the fact of being unhappily married would lend a favorable, rather than an unfavorable, coloring to the memory of earlier relationships.

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# THE EXPERIMENTAL MEASUREMENT OF A SOCIAL HIERARCHY IN *GALLUS DOMESTICUS*: V. THE POST-MORTEM MEASUREMENT OF ANATOMICAL FEATURES<sup>1</sup>

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With the appearance of each successive paper in this series, it becomes increasingly important that each paper be considered in sequence with the previous papers. For the convenience of the reader it seems necessary to continue in each paper a brief summary of the findings of the previous papers (4, 5, 6, 7).

Beginning at sixteen weeks of age, six young roosters are arranged in a hierarchy of dominance, the order being determined by the number of individuals in the group that each rooster is able to defeat in physical combat (Social Reflex No. 2). This order of ranking is revised at intervals of four weeks from the 16th to the 36th weeks. Beginning immediately after being taken from the incubator, these individuals had been tested at frequent intervals in the Social Reflex Runway. This test consisted simply of releasing two individuals simultaneously from opposite ends of the runway, and then observing the time spent and distance traversed by each in running to the other (Social Reflex No. 1). Various operations involving the concepts of physics were applied without great success to these data. Then simple measurements of time and space were applied. When plotted as a function of Social Reflex No. 2, it was found that Social Reflex No. 1, plotted in terms of space alone, was almost truly linear. A theoretical correction of the abscissa units, which agreed with the empirical data, satisfied the requirements of linear function.

Social discrimination in *Gallus domesticus* is identified as it

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<sup>1</sup>Beginning with the section headed *Procedure* and continuing through the section headed *Special Groups of Characters*, this paper was written by C. M. Pomerat. The other sections of the paper were written by Carl Murchison. C. M. Pomerat planned the measurements, and he and M. X. Zarrow executed the measurements.

is measured in the Social Discrimination Cage. When the discriminations are plotted against Social Reflex No. 2, a relationship appears which approaches a linear form. When the discriminations are plotted against Social Reflex No. 1, true linearity is approximated at the 36th week. The analyses show that male discriminations for pairs of males are away from dominance, and that female discriminations for pairs of males are in the direction of dominance. The constancy of this trait in males makes it possible to measure social discrimination in *Gallus domesticus* in units of space.

Social Reflex No. 3 (the sex reflex) is measured in terms of the total treadings in which each individual engages during a period of time. As so measured this reflex in male *Gallus domesticus* is a linear function of Social Reflex No. 1 and Social Reflex No. 2, while in female *Gallus domesticus* it is a function of Social Reflex No. 1. Observations seem to indicate that such subjective matters as sex favoritism, social insults, and social integration may eventually be exhibited as linear functions of such measurable quanta as Social Reflex No. 1, Social Reflex No. 2, and Social Reflex No. 3.

Under the conditions of this experiment the net loss in body weight over a divided period of 48 hours of starvation containing equal increments of inactivity and social activity approximates true linear functions of the three social reflexes and of social discrimination, but raises no question of metabolic causality.

The object of the present study is to determine whether the three social reflexes can be explained in terms of physical superiority as expressed by body measurements, weight of endocrine glands, size of secondary sexual characters, chemical composition of the blood, or blood count.

### PROCEDURE

After having made a series of erythrocyte counts the animals were carefully weighed and then killed by bleeding. Blood was taken for chemical analysis at this time in test tubes containing potassium oxalate. The pituitary was removed under binocular by cutting the stalk, opening the sella (dorsal approach), removing the dura, and lifting out the gland. The anterior lobe was then quickly dissected free and weighed to tenths of a milligram. The thyroids, adrenals,

and testes were then dissected out and weighed separately. Uniform procedure was followed to insure speed and accuracy. In spite of this care the anterior pituitary of animal *Green* and the right thyroid of YY were damaged and, therefore, are not included in the table which follows.

The measure of intestinal length was made according to the technique employed by Riddle (10). As soon as peristaltic action had ceased the mesenteric folds binding all curvatures were cut and the intestine lying between the gizzard and the anus was laid on a meter stick and measured.

Body measurements, such as interorbital width, length of spur, etc., were made with the use of dividers and calipers. The structures measured and techniques employed were based on Baldwin's *Measurements of Birds* (1). The comb and lappets were dissected free in as nearly uniform a way as possible. The area of the lappet was determined by means of a Willis planimeter.

#### THE RAW DATA

The measurements which were obtained have been grouped in four tables: general body measurements, weight of endocrine glands, blood chemistry values, and erythrocyte counts. All measurements are given in the metric system. Values, with the exception of those dealing with the blood, have been grouped both as to the position of the birds in the dominance hierarchy and according to the size or the weight of the individual character. In those instances where two or more birds were found to have exactly the same size, they have been grouped together in the "size, weight" portion of the tables. All of these measurements are given in Tables 1-4.

It will be seen that in no single character do the order of the social hierarchy (YY, *Blue*, *Green*, *Red*, *White*) and the order of size and weight exactly correspond. Moreover, the reverse order is not encountered. The most dominant rooster (YY) generally exhibits average values for the body measurements studies while animal *Green* tends to show the largest, and animal *White* the smallest values. It might be said that, roughly, the arrangement of these birds according to size of the twenty-seven characters listed in Table 1 is approximately as follows: *Green* (largest), YY, *Blue*, *Red*, *White* (smallest). Similarly, animal *Green* had distinctly the



TABLE 1  
BODY MEASUREMENTS

No.	Character	Order in dominance hierarchy					Order arranged according to size and weight of character				
		YY	Blue	Green	Red	White	I	II	III	IV	V
1	Final body weight	3401.10	2989.07	3071.13	3001.15	2792.16	YY	G	R	B	W
2	Exposed culmen length	27	27	26	22	26	(YY,B)	(G,W)			R
3	Bill length from gape	42	45	42	40	41	B	(YY,G)	W		R
4	Height of bill at base	15	16	15	15	14	B	(YY,G,R)			W
5	Width of bill at gape	28	31	28	29	28	B	R	(W,G,YY)		W
6	Length of base of comb	64	59	62	59	54	YY	G	(B,R)		W
7	Greatest length of comb	122	111	123	129	113	R	G	YY	W	B
8	Height of comb	59	56	63	57	68	W	G	YY	R	B
9	Weight of comb	40.714	28.301	37.94	35.45	44.784	W	YY	G	R	B
10	Comb weight / body weight	0.01197	0.00947	0.01248	0.01181	0.01603	W	G	YY	R	B
11	Area of lappets in sq. mm.	4853.86	4922.60	5687.14	3671.64	2650.87	G	B	YY	R	W
12	Inter-orbital width of head	31	31	31	32	31	R	(B,G)	(YY,B,G,W)		
13	Length of head from nostril	66	69	69	62	64	B	G	YY	R	W
14	Length of keel	138	146	145	137	136	G	B	R	(YY,W)	
15	Length of forearm	112	118	119	117	112	G	B	W	R	YY
16	Length of hand	102	108	113	103	105	G	B	R	YY	W
17	Length of leg	435	451	480	450	532	G	B	W	R	YY
18	Tibia length	173	182	187	175	177	G	B	W	(YY,B)	
19	Diameter of mid-tarsus	18	18	22	20	20	G	(R,W)			
20	Length of middle toe	55	57	66	60	51	G	R	B	YY	W
21	Length of hind toe	21	21	22	23	24	W	R	G	(YY,B)	
22	Length of spur from scale (Rt)	27	20	24	28	33	W	R	YY	G	B
23	Length of spur from scale (Lt)	24	19	23	27	30	W	R	YY	G	B
24	Greatest width of spur (Rt)	13	10	12	12	10	YY		(R,G)	(W,B)	
25	Greatest width of spur (Lt)	13	10	12	12	10	YY		(R,G)	(W,B)	
26	Inter-trochanteric span (dorsal)	111	110	117	109	99	G	YY	B	R	W
27	Intestinal length	171	137	163	155	146	YY	G	R	W	B

TABLE 2  
ENDOCRINE GLANDS

No.	Character	Order in dominance hierarchy			Order arranged according to size and weight of character		
		YY	Blue	Green	Red	White	
28	Thyroid weight (left)	0.079	0.0675	0.075	0.1527	0.0625	R
29	Thyroid weight (right)		0.078	0.102	0.057	0.062	G
30	Total thyroid weight		0.1455	0.177	0.2097	0.1245	R
31	Total thyroid/body weight, $\times 10^{-5}$		4.8677	5.7634	6.9873	4.4589	R
32	Suprarenal weight (left)	0.065	0.0705	0.159	0.1799	0.0588	G
33	Suprarenal weight (right)	0.0745	0.076	0.124	0.097	0.051	G
34	Total suprarenal weight	0.1395	0.1465	0.283	0.1769	0.1095	G
35	Total suprarenal/body weight, $\times 10^{-5}$	4.1016	4.9012	9.2149	5.8944	3.9217	G
36	Ant. pituitary weight	0.011	0.102		0.0125	0.0062	R
37	Ant. pituitary/body weight, $\times 10^{-6}$	3.2342	3.4124		4.1651	2.2205	R
38	Testis weight (left)	12.017	16.25	16.35	14.048	7.543	G
39	Testis weight (right)	8.475	9.971	15.6	11.047	7.35	G
40	Total testis weight	20.492	26.221	31.95	25.095	14.893	G
41	Total testis/body weight, $\times 10^{-3}$	6.0251	8.7723	10.4033	8.3618	5.3339	G
42	Dry weight of testis (left)	0.1363	0.1896	0.1950	0.1685	0.1000	G
43	Dry weight of testis (right)	0.1005	0.1182	0.1855	0.1404	0.0995	G
44	Total testis dry weight	0.2368	0.3078	0.3805	0.3089	0.1995	G
45	Total testis dry/body weight, $\times 10^{-5}$	6.9625	10.2975	12.3896	10.2927	7.1450	G

\*Not comparable owing to incomplete data.

TABLE 3  
BLOOD CHEMISTRY

No.	Character		YY	Blue	Green	Red	White
46	Non-protein nitrogen	(mg./100cc)	37.5	25.0	26.5	35.3	23.1
47	Creatinin	( " " )	1.3	1.3	1.3	1.3	1.3

TABLE 4  
ERYTHROCYTE COUNTS  
(Character No. 48)

	YY	Blue	Green	Yellow	Red	White
1/25/35	3,750,000 3,920,000				3,280,000 3,260,000	3,800,000 3,850,000
1/28/35	4,330,000 4,180,000 4,180,000 3,920,000	3,820,000 3,720,000	3,390,000 3,230,000	3,300,000 3,350,000		
4/7/35	3,550,000 3,680,000 4,270,000 4,130,000	3,920,000 4,100,000 4,010,000	3,280,000 3,160,000 3,370,000		3,370,000 3,910,000 4,380,000	4,390,000 3,880,000 4,390,000
4/8/35	4,000,000 3,990,000	3,950,000 3,870,000 3,960,000 3,700,000	2,960,000 2,800,000 2,660,000 2,850,000		3,470,000 3,660,000 3,370,000 3,420,000	4,110,000 4,120,000 4,230,000 4,110,000
4/10/35	4,120,000 4,090,000 4,040,000	3,990,000 3,880,000	2,810,000 2,900,000 2,800,000 2,830,000		3,430,000 3,320,000	3,650,000 3,750,000 3,920,000 3,740,000
4/11/35		4,050,000 3,820,000 3,830,000			3,420,000 3,350,000 3,200,000	
Average	4,010,000	3,901,333	3,022,143	3,325,000	3,488,571	3,995,385

heaviest and animal *White* the lightest endocrine organs. The blood picture shows animal *YY* to have had the largest average erythrocyte count and amount of non-protein nitrogen with animals *Green* and *White*, respectively, at the opposite end of the series in these characters. It is hardly justifiable, however, to "pool" these data in such a fashion and one must necessarily examine the features of the individual birds and the importance of various groups of related characters.

#### PHYSICAL FEATURES OF INDIVIDUAL BIRDS

1. *Animal YY*. This bird was the heaviest of the series yet it was found to have, in general, the shortest appendicular skeleton.

In contradistinction, animal *Green*, though lighter, had the longest appendages. In contrast to all other members of the group, YY had an enormous collection of fat in its abdominal cavity. Although this was not weighed separately, it undoubtedly accounts, to a large extent, for the superior weight of this bird. In connection with this excess of fat, it is notable that YY had the highest value for non-protein nitrogen (products of both anabolism and catabolism), the greatest intestinal length and the largest average erythrocyte count. The combination of these characters suggests a specialized metabolism which may be linked with the observed social dominance. The weight of the gonads was relatively low.

2. *Animal Blue*. Second in the dominance hierarchy, animal *Blue* was *not* found to approximate YY in the latter's outstanding characteristics. *Blue* showed very little abdominal fat, the shortest intestine, relatively low values for non-protein nitrogen and erythrocyte number. This bird had the largest bill and longest head but the smallest comb and spurs.

3. *Animal Green*. Second only to YY in weight, this rooster had the longest appendages. In no character examined was it found to show the smallest weight or size. Animal *Green* had the largest lappets and a very well developed comb. In connection with these secondary sexual characters it is interesting that the heaviest testes and adrenals were found in this bird. Unfortunately it was not possible to compare the pituitary weight. On the basis of these general body and endocrine measurements, *Green* is the superior member of the series, although its blood picture is decidedly at the opposite end of the scale.

4. *Animal Red*. With the exception of its first position in the order of thyroid and pituitary weights and a relatively short head, this animal had, in general, features of average dimensions.

5. *Animal White*. Physically the smallest member of the series as seen from measurements of body weight, bill, keel, forearm, leg, mid toe, and inter-trochanteric width, and all endocrine glands studied, animal *White* is the only member of this series which shows any real correlation between physical features and its position in the dominance hierarchy reported.

## SPECIAL GROUPS OF CHARACTERS

*General body measurements* of head, keel, and appendages show, in general, approximately the same serial order in the five birds studied but with relatively low correlation with total body weight. Body weight and intestinal length seem highly correlated.

*Secondary sexual characteristics* such as the comb, lappets, and spurs show little correlation with each other or with the testis weight.

*Endocrine weights* in the five roosters studied follow the same general order of weight. There is no parallelism between the size order and the order of social dominance with the exception of animal *White*. Freeman (3), in a recent study on the weights of endocrine glands, reports that "with a few exceptions, the gross weight of organs investigated has thrown little light upon their relative activity." The testis of animal *Yellow*, which died shortly prior to the close of the experiment, April 1st, had the lowest testis weight (2.6 gms.). No correlation was found between pituitary size and intestinal length (see Riddle, 9, 10).

*Erythrocyte counts* showed some parallelism with the social hierarchy. Unfortunately equipment for basal metabolism was not available and, in view of the fact that hemoglobin and blood volume values are necessary to calculate the  $O_2$  carrying capacity of the blood, no reliable measure of metabolism can be worked out from the erythrocyte counts. The average erythrocyte value based on six roosters (total of 73 counts) was 3,623,738 as compared with 3,267,000 (for fowl) given by Forkner (2) and 2,400,000 given (for the species) by Ponder (8).

## THEORETICAL DISCUSSION

None of the anatomical measurements correlate any better with the social reflexes than does the single measurement of gross body weight. This negative result is highly significant, as both popular and expert opinion would have been in the opposite direction.

This result minimizes the importance of anatomical structure in these situations, but does not eliminate the question of physiological function. As far as these experiments are concerned, adequacy of physiological function may vary independently of the size of anatomical structure.

It would seem that the next step is to vary experimentally the



secretions of the endocrine glands. That sort of thing, in order to be convincing to one skilled in dealing with social hierarchies, must be done on groups in which straight-line dominance has been established and has become stable.

### GENERAL SUMMARY

The five surviving members of a social hierarchy, male *Gallus domesticus*, were subjected to various physical measurements and blood analyses. The physical measurements especially concerned the head, the beak, the comb, the wattles, the legs, the toes, the spurs, the intestines, the endocrine glands, etc. The blood analyses consisted of a blood count and the chemical determination of non-protein nitrogen and of creatinin. None of these measurements indicated an orderly relationship with the social reflexes. It seems very unlikely that size of anatomical structure alone has any important relationship with the social reflexes. This result does not eliminate the question of physiological function in relation to rank in a social hierarchy, and that question becomes open for experimental investigation. It is suggested that such experiments be done only on those groups in which straight line dominance has become established and stable.

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# LA MESURE EXPÉRIMENTALE D'UNE HIÉRARCHIE SOCIALE CHEZ *GALLUS DOMESTICUS*: V. LA MESURE POST MORTEM DES TRAITS ANATOMIQUES

(Résumé)

Les cinq membres survivants d'une hiérarchie sociale, *Gallus domesticus* mâle, ont subi diverses mesures physiques et analyses du sang. Dans les mesures physiques il s'agit surtout de la tête, du bec, de la crête, de la barbe, des jambes, des orteils, des éperons, des intestins, des glandes endocrines, etc. Les analyses du sang se sont composées d'un compte du sang et de la détermination chimique du nitrogène non protéine et de la créatinine. Aucune de ces mesures n'ont indiqué une relation régulière avec les réflexes sociaux. Il ne semble pas du tout probable que la grandeur de la structure anatomique seule ait une relation importante avec les réflexes sociaux. Ce résultat ne répond pas tout de bon à la question de la fonction physiologique quant au rang dans une hiérarchie sociale, et cette question reste ouverte pour l'investigation expérimentale. On suggère que l'on fait de telles expériences seulement sur les groupes où la dominance en ligne droite est devenue établie et stable.

MURCHISON, POMERAT, ET ZARROW

# DIE EXPERIMENTELLE MESSUNG EINER SOZIALEN HIERARCHIE BEI *GALLUS DOMESTICUS*: V. DIE MESSUNG DER ANAT- OMISCHEN EIGENSCHAFTEN NACH DEM TODE

(Referat)

Die fünf überlebenden Mitglieder einer sozialen Hierarchie, beim männlichen *Gallus domesticus*, wurden verschiedenen physischen Messungen und Blutuntersuchungen unterzogen. Besonders die physischen Messungen bezogen sich auf Kopf, Schnabel, Kamm, Bart, Beine, Zehen, Sporen, Eingeweide, die endokrinen Drüsen usw. Die Blutanalysen bestanden aus einer Blutzählung und der chemischen Bestimmung des Nichtproteinstickstoffes und des Kreatinins. Keine dieser Messungen deutet auf ein geordnetes Verhältnis zu den sozialen Reflexen an. Es scheint sehr unwahrscheinlich, dass die Grösse der anatomischen Struktur allein irgendein wichtiges Verhältnis zu den sozialen Reflexen besitzt. Das Resultat löst die Frage der physiologischen Funktion im Verhältnis zur Rangordnung in einer sozialen Hierarchie nicht, und jene Frage bleibt der experimentellen Untersuchung offen. Es wird vorgeschlagen, dass solche Experimente nur auf Gruppen angewandt werden sollten, bei denen die geradlinige Herrschaft festgestellt wurde und stabil geworden ist.

MURCHISON, POMERAT, UND ZARROW

# TOWARDS A THEORY OF SOCIAL DYNAMICS\*

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J. F. BROWN

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## I. INTRODUCTION

While much of psychology has advanced since James's (16) famous dictum concerning psychology as a science, that branch called social psychology is even today adequately characterized by it. James referred to the psychology of his time as being, "A string of raw facts; a little gossip and wrangle about opinions; a little classification and generalization on a mere descriptive level. . . . This is no science, it is only the hope of a science." This is certainly true of contemporary social psychology with its many minor theories, its various data so capable of equivocal interpretation and its "experiments" and "measurements" which no physicist or chemist would honor with the title.<sup>1</sup> There are several reasons to believe, however, that the stage is now set for a real advance.

All science has recently gone through a crisis. Physics felt the crisis first, then general biology, then psychology. Physics has practically overcome its crisis, but the methodological lessons learned from this crisis have as yet but little affected social psychology. The chief result of these crises has been a renewed interest in "critical" rather than "speculative" philosophy, in methodology, in the philosophy of science. Perhaps the future scientist will look back and see as the *chief single discovery* of the early twentieth century, the discovery of the *scientific method itself*. In this paper, we shall examine certain recent advances in the theory of science which are now applicable to psychology with the hope of seeing how applicable they are to social psychology. We will first be concerned with methodological problems common to all the sciences, then with the

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<sup>1</sup>The status is adequately characterized by the recent works of Sorokin (37) and Karpf (18).

possibility of a dynamic approach to social psychology, and finally with the first applications of this new approach to its problems.<sup>2</sup>

## II. "CLASS" THEORY *vs.* "FIELD" THEORY

Recent methodological investigation has clarified several important problems of biological science. Striking progress has been achieved towards clarification of the possible philosophies of biology. By philosophy of biology is meant the basic postulates underlying the various theories and "isms" of the biological sciences. It has been shown that contemporary biological and sociological theories are all variations on two themes, that of atomistic-mechanism and that of organismic theory. Both of these are worthy of scientific consideration. A third theme, vitalism, is nothing but atomistic-mechanism plus some unobservable and hence scientifically worthless causal factor.<sup>3</sup> The philosophy of atomistic-mechanism accepts either implicitly or explicitly that *the organism is a machine, that the action of the whole is to be explained out of the working of its parts, and that all science must be reduced to the mathematical-physical sciences.* Opposed to this the organismic theory accepts as its philosophy that *the organism is to be looked on as a system of energy, that the whole is more than the sum of its parts, and that both physical and biological sciences are amenable to the logic of dynamics.* We shall see shortly which of these philosophies of biology promises most for social psychology.

Recently also there has been a considerable clarification of the best method of gathering data. Here differences in the various viewpoints may again be reduced to two basic ones, the inductive and the hypothetical-deductive. In the inductive method one supposedly (1) measures, (2) finds the correlations between the events measured, (3) expresses the high correlations found as laws, and (4) relates these laws under theories. The hypothetical-deductive method to be sure starts with experience, but before one can measure, one must

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<sup>2</sup>This paper is abridged from the methodological section of a work to be called "The Dynamics of Social Fields" with which I am now engaged. I wish to present this paper to the social psychologists now to "clear the way" for the later work.

<sup>3</sup>The underlying similarities between opposed theories in biology has been shown in many recent works, most notably by psychologists Köhler (20) and Wheeler (43); by biologists von Bertalanffy (2) and Woodger (44).



have a "hunch" about what the possible laws of experience may be. "Hunches" arise on the basis of data in a state of preliminary organization and accumulation. It has been shown, although this seems very paradoxical at first, that the *measuring instrument results from the law rather than the law from the measuring instrument*.<sup>4</sup> The steps in the hypothetical-deductive method become: (1) one has a hunch about nature; (2) this hunch is formulated into a working hypothesis (i.e., law); (3) one verifies this law in an experiment; (4) it is then possible to repeat the experiment which uncovered the law (i.e., one can make measurements).

Besides two philosophies of biology and two scientific methods two types of scientific language may be distinguished. The language in which we make our statements about social psychology will be related both to our philosophy and to our choice of a method. This difference in scientific language has been pointed out recently by German philosophers and psychologists.<sup>5</sup> When one speaks of common experience in everyday language, making such statements as "the table is red," "I smell gasoline," or "the child wants the piece of candy," one is using the "language of data" (Carnap, 6). When one orders these descriptions to statements like "a photo-sensitive organ is reacting in a photoelectric field to wave-lengths of 670  $\mu\mu$  distributed spatially in a certain pattern," "a chemicosensitive organ is reacting in an atmospheric field in which there is a substance having such and such a benzene ring structure," or "there is a tension toward a goal in the child's psychological field," one is using the "language of constructs" (Carnap, 6). Expressed in another way the first statements are about "phenotypes," the second are about "genotypes" (Lewin, 24). By phenotype Lewin means the experience which one expresses in the ordinary language of phenomena; by the genotype he means the underlying dynamic situation.

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<sup>4</sup>These points are demonstrated by Brown (3) in more detail. Cf. also Lewin (24, 25). Similar ideas concerning measurement are expressed in Campbell (5) and Nagel (33). The hypothetical-deductive method is closely related to the method of dialectic materialism. The writer hopes to demonstrate this later in a separate paper.

<sup>5</sup>Cf. Lewin (24), Carnap (6), and Neurath (34). Although Lewin and Carnap and his followers disagree on certain points they are working in the same direction. It would take us far beyond the limits set for this paper to go into these differences here. In brief, Carnap and his followers will not admit the logical stringency of Lewin's constructs and are inclined to look on them as of heuristic value only.



The organismic philosophy of biology, the hypothetical-deductive method, and the language of constructs are *all* related and represent what the writer believes to be *the* scientific method. Modern physics, and few will deny that modern physics represents experimental science par excellence, uses them all in what has been called the field-theoretical approach.<sup>6</sup> Opposed to this is the combination of the atomistic-mechanistic philosophy, the inductive method, and the language of data which may be called the class-theoretical approach. In the following lines we shall summarize the basic differences between a field-theoretical and a class-theoretical approach.

We shall set up ten criteria for both "class" and "field" theory. These criteria are to be looked on as neither methodologically nor logically final. It is relatively easy to reduce the number of criteria to considerably less than ten or to spin it out to considerably more. The list as given, however, has proven itself valuable in examining various psychological and biological theories. It is to be looked on as tentative and chiefly of heuristic value. By the designations "field" and "class" we do not intend to imply the mathematical, physical, or logical properties of these terms but rather "types" of thinking. In the following exposition we shall contrast "field" and "class" theory in two columns. After each criterion we give one or two examples to show the prevalence of class-theoretical concepts in contemporary sociology and social psychology.

#### *Criteria for Class Theory*

1. The behavior of objects is determined by the "class" to which they belong.

#### *Criteria for Field Theory*

1. The behavior of objects is determined by the structure of the "field" of which they are a part.

In a "class" theory, the characteristics of behavior common to different individuals of a class are abstracted. If the behavior of another individual shows these characteristics, it is included in the class, and the behavior is then regarded as explained. In explaining an event in a field theory, the structure of the field is characterized in terms of laws, which we shall see are logical constructs. If the behavior of the object follows these laws, it is said to be explained.

Social-psychological thinking at the present time abounds in analyses wherein certain common characteristics are abstracted from a

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<sup>6</sup>The following section of the present paper is abridged from Brown (4) where physical and psychological examples of the two modes of thought are given.

class and behavior is "explained" by showing that the individual event belongs to this class. Practically all racial and national sociology is to be so characterized. Germans are said to be industrious, frugal, sentimental, etc. Herr X is industrious, frugal, sentimental, etc. Herr X is a German, therefore his industry, etc., is "explained." John Y who is normally very rational takes an active part in a brutal lynching as a member of a mob. Mobs are governed by a "mob mind." John Y's abnormal behavior is hence explained as belonging to mob behavior. Concepts like "*Zeitgeist*," "*Nationalgeist*," and the like are quite obviously "class" concepts. Similarly those statistical studies which attempt to derive certain behavior from the fact that a given individual is a white city-dweller with an income of \$2,500 also are to be so classified. In a theory of the social field the attempt would be made to *deduce* such behavioral characteristics from the underlying field structure. In this paper shortly we shall attempt such an analysis. To clarify the idea at this point let us say that the industriousness, frugality, and sentimentality of the German depend on the "expanding fluidity" of the social field during the later nineteenth century. The lack of frugality during Germany's inflation period and the lack of "sentimentality" of Hitler's Storm-Trooper are not "abnormal" but are determined in a field of different structure.

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|---|---|
| 2. The force directing behavior shows the properties of an entelechy. | 2. The force directing behavior shows the properties of a vector. |
|---|---|

All concepts like instinct, purpose, libido as used in contemporary social psychology are entelechy concepts rather than vector concepts. One specific example must suffice. In Thomas' (39) well-known theory the four basic wishes have the properties of entelechies, i.e., they are forces within the objects in the field, rather than vectors whose direction and magnitude are determined by the field structure. Basic drives such as Thomas' four wishes, Freud's (13) libido, and McDougall's (31) purpose all show the characteristics of entelechies rather than those of vectors. In a theory of the social-psychological field behavior would follow lines of field force or vectors.

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|----------------------------------|-------------------------------------|
| 3. There is local determination. | 3. There is no local determination. |
|----------------------------------|-------------------------------------|

The German's industriousness is determined "in" the German. Similarly the basic wishes are determined "in" the individual. This is also patently true of all those theories which Sorokin considers

under the general topic, "Anthropo-racial, Selectionist, and Hereditarist School" (37). In the social field, the movements are determined by the existing structure of the social field, not within the individuals of the field.

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|---|--|
| 4. The concepts used in "class" theory are primarily substantial. | 4. The concepts used in "field" theory are primarily functional. |
|---|--|

Not only are individualistic concepts like libido, instinct, wish, and purpose to be looked on as substantial, but also the collectivistic concepts like McDougall's (31) "Group Mind," and Durkheim's (11) and Levy-Bruhl's (23) "Collective Representations." Neither the behavior of the individual nor that of the group is to be explained by inner forces which depend for their efficacy on the character of the substratum but by the functional relationships in the social field in a field theory.

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|---|--|
| 5. The method of scientific analysis is primarily structural. | 5. The method of scientific analysis is primarily functional (relational). |
|---|--|

The field theorist always expresses his analyses in a series of functional relationships (Cf. Brown, 3).

Sociological analyses which use statistical tabulations without attempting statistical correlations are primarily structural. At the present time, even when correlations are attempted they are usually so low that one cannot adequately speak of functional analysis. It is scarcely necessary to give detailed examples of this point. In a field theory statistical correlations and tabulations would be useful in helping to define the field forces in terms of magnitude and direction. They would have no "explanatory" value in themselves.

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|--|--|
| 6. The analysis is in terms of historically and geographically conditioned regularities. | 6. The analysis is in terms of ahistorical-typical laws. |
|--|--|

The field theorist *orders* his experience to logical constructs, for instance, the gravitational field and the social field. Insofar as his phenotypical experiences may be so ordered to these genotypical constructs that he may deduce what his subsequent experiences will be, he considers his scientific analysis successful.<sup>7</sup> The relationship be-

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<sup>7</sup>Ordering phenotypical experience to genotypical constructs (Lewin, 26) may also be expressed (with some reservations, cf. above) as translating "*Protokolsprache*" into "*Physikalschesprache*" (Carnap, 6). According to Lewin phenotypes represent experience; genotypes, the underlying dynamic situation.

tween time and space expressed in the law of falling bodies, although never agreeing precisely with actual data, presumably holds for all past and future historical times and for all positions in the cosmos. Explanation of an event consists in adequately describing the underlying genotype and in seeing if the phenotype (experience or data) may be precisely *ordered* to it. *Laws are descriptions of genotypes.*<sup>8</sup>

It is here that "field" theory enjoys the greatest advantage over "class" theory. When the laws (genotypes, underlying dynamics) are well enough known to allow measurement, one can predict the future quite independently of the past. That the climate of the past, soil erosion in the past years, the date of the spring thaw, etc., all have some part in determining the time at which an individual apple will fall is obvious. But the contemporary physicist, if he could make certain measurements, could predict the fall of the apple and where it would land with a high degree of accuracy quite without reference to its past history. He might characterize the fall with a single vector. He needs no knowledge of the history of the tree. Although it is true that the past and future are implicit in the idea of a vector, such use of "time" is to be sharply distinguished from "time" in the historical sense. In modern physics time becomes one dimension of the space-time manifold. The constructs hence include a temporal dimension, and when the physicist can manipulate events in this dimension, history as popularly understood becomes a matter of indifference to the physicist. When we characterize the field theory as *ahistorical* it does not mean that temporal change is of no importance to us but rather that what we must know of time is included in the *construct* of the field. Biological scientists invariably excuse their lack of precision by referring to difficulties from a genetic standpoint. Methodologically, we see no difference between physical and biological problems, except that the biologist is not yet able to measure. It is an open question whether social science can discover completely ahistorical laws. But the laws certainly can tend toward such a goal.

All social-psychological theories which are primarily evolutionary theories from Spencer (38) to A. G. Keller (19) are to be characterized as "class" theories in this respect. Whenever theories "explain" present behavior as "caused" by events in the more or less

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<sup>8</sup>Cf. Lewin (26). I am indebted to Professor Lewin for allowing me the use of the manuscript of his book.



remote past, or attempt to "explain" events as being conditioned by specific historical and geographical conditions, we have "class" theory.

7. The method is primarily empirical.

7. The method is hypothetical-deductive.

In field-theoretical analyses all experiments are critical, i.e., they are performed to test the validity of rather precise working hypotheses. The hypotheses themselves first occur on the basis of existing knowledge in the form of a "hunch." A "hunch" is psychologically an insight into possible correlations of data in a state of preliminary organization. If one could set up precise rules for getting "hunches" the task of scientific investigation would be an easy one. Unfortunately this cannot be done. The hypotheses themselves require an adequate definition in terms of the original concepts and the experimental situation must be adequate to decide on the validity of the hypotheses. Working hypotheses then precede experimentation. As Dingler (8) has pointed out, state-

ments like  $s = \frac{gt^2}{2}$  cannot possibly be verified purely inductively.

When, however, under increasingly well-controlled conditions, the data more and more approximate the law (or working hypothesis) we consider it verified.

Naturally all purely empirical statistical approaches in sociology and social psychology are to be classified as "class" theory on this point. Likewise to be classified is the empirical approach of Pareto (35), although in many single points Pareto comes very close to the hypothetical-deductive method. In a field-theoretical attack on the problems of sociology one should speculate on the structure of the social field, but one should entertain only speculations which may be verified either through experiment or through subsequent change in social organization.

8. The analysis allows dichotomies.

8. The analysis allows no dichotomies.

It may be that nature is not homogeneous, uniform, and continuous, but by postulating continuity, uniformity, and homogeneity science has gained its greatest triumphs. Elaboration of this point would be completely superfluous. Furthermore there may be an ultimate variety of kinds in nature without any particular variation



in the methodological approaches applicable to each level or kind. At all events modern physics denies dichotomies and modern psychology tends more and more to do so.

Sociological and social-psychological writing abounds in dichotomies. The division of behavior into the intelligent and the instinctual is an example of this. The division made by practically all writers on the topic of mob between normal individual behavior and "abnormal" mob behavior is another.

- |   |   |
|---|---|
| 9. "Class" theory tends to use evaluative concepts. | 9. "Field" theory insists on non-evaluative concepts. |
|---|---|

Neurath (34) has pointed out that practically all "sociologies" have been written from the standpoint of a certain class or a certain political faith, or even religious faith. Pareto (35) in his monumental treatise gives hundreds of examples of this unscientific aspect of most social-psychological works. We by no means deny that a scientific social psychology should be employed to alleviate humanity's woes. In the past, however, personal evaluations of social problems have dictated the social psychology rather than the inverse of this. When a science can control and predict natural events, it will and should be used to benefit humanity. But predictions based on "class" theory have shown themselves very inadequate in the past. We should attempt to write a social psychology absolutely without class, race, or personal bias, although this is a very difficult, perhaps even an impossible, thing to accomplish.

- |   |   |
|---|---|
| 10. "Class" theory attempts to answer a metaphysical "why?" | 10. "Field" theory attempts to answer a scientific "how?" |
|---|---|

Aristotle was trying to answer the question: "Why do bodies move?" Galileo, the first thinker in the field-theoretical tradition, attempted the more modest question: "How do bodies move?" I believe it could be shown that the question "why?" as posed by Aristotle must imply a metaphysical and hence meaningless answer. Whenever one poses questions like "why movement?", "why life?", "why love?" one must begin to think in terms of animism and "class" theory. To a certain extent "field" theories also answer the question "why?", but it is a different sort of "why?" It is, I believe, synonymous with "how?" Field theory, as we have seen above, shows the logical necessity of connection between events by ordering phenotypical or observed data to genotypical constructs.

Science never explains why nature is the way it is, but simply relates certain events to others in terms of logical necessity. It does not even answer *why* they should be related at all, but simply shows *how* they are related. Explanation in science is description in a language which allows us to derive certain necessary implications from certain concrete cases.

Sociological writing today is a rather indiscriminate mixture of metaphysical *why* explanations with scientific *how* explanations. On this point again both Neurath and Pareto have much to say which is illuminating. Wherever Hegelian concepts appear, and they appear in much contemporary social psychology, they are used to answer the question of "why?"

Is there any social-psychological theory which fulfills all the criteria for "field" theory? We believe not. Many of the single criteria are fulfilled by individual writers. Other writers are thinking almost completely in terms of "class" theory. We shall next attempt to develop the dynamic concepts necessary for a field-theoretical approach to certain social-psychological problems.

### III. SOME BASIC CONCEPTS OF FIELD DYNAMICS

1. *The Logic of Dynamics.* The basic idea behind the method of field-dynamics (i.e., the combination of the hypothetical-deductive method with the language of constructs) is that one may construct genotypic descriptions to which phenotypic descriptions may be *ordered*. If the construct is adequate to the data at hand, one may logically derive what subsequent experience will be. One may predict the future on the basis of the existing structure of the genotype. Furthermore, one may understand the present through this ordering, and if one understands the laws of temporal change in the structure of the genotypes, one may also explain how the past has developed into the present. Causation in a theory of field dynamics is always simultaneous, however, from the underlying genotype to the existent phenotype. For every change in the phenomenology of experience there is a change in the structure of the underlying dynamic field. Consequently, "explanation" of the present from the past or "prediction" of the future from the present requires a knowledge of temporal processes in the underlying field. These processes themselves are to be looked on as *ahistorical-typical*, in the sense we have used this designation above.

The biology and sociology of the nineteenth century were concerned primarily with attempts to understand existent nature, while nineteenth-century physics was concerned with the *manipulation* of the forces of nature in order to use them. Instead of investigating physical systems under "natural" conditions alone, the physicist has always created situations which are "unnatural" in that they are not commonly found in nature before physical manipulation. It is to such manipulation that we owe electric refrigeration, the radio, the aeroplane, in fact all the boons of applied physics. Readers familiar with the outlines of the development of thermo-dynamics or electro-magnetism in the nineteenth century will readily see what is meant by this manipulation.<sup>9</sup>

While the physicist may perform the manipulation, without which the measurements necessary to prediction cannot be made, the social psychologist, for quite obvious reasons, has not been able to do so. This means that we cannot hope, at least in the near future, to arrive at anything like the quantitative precision of the physicist. If we clearly realize this type of limitation, however, it should help us to define what type of social behavior can most profitably be studied by a field-dynamical approach. It may have already occurred to some of our readers that it would be worth while to look for cases where nature herself is manipulating social forces in such a way that the *degree of freedom* of social activity is very much limited in its direction (under dictatorship, for instance) and to compare these with other cases where social forces have a considerable *degree of freedom* (upper-class social behavior in liberal democracies).<sup>10</sup> In other words, one must attempt to find existing social situations which in their own inherent dynamics present the prerequisites of "control."

Some social situations, we believe, may be characterized dynamically so that one can definitely limit the possibilities of future

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<sup>9</sup>Some recent important advances in biology have been towards a "science of manipulation." Cf. the recent work in experimental embryology and morphogenesis, among others Dürken (10) and Child (7). That physical manipulation should so far precede biological manipulation is itself a problem for sociology. It is to the credit of Marx (29) that he at least attempted an answer to this.

<sup>10</sup>"Degree of freedom" is used in the technical dynamic sense. In physics, for instance, a billiard ball on a billiard table has two degrees of freedom while a ball in a groove of an inclined plane has only one, etc.

activity even if one cannot make quantitative, directional predictions. We believe that one can further show the logical (in the sense of dynamics) necessity for certain associated phenomena, such as the decline in individual freedom under a collectivistic political structure, the greater religious discipline of the Catholic and dogma of infallibility, the position of women under Fascism, and the position of women under Communism. One can further show that questions like "Why can we not have the advantages of Hitlerian co-operation combined with the freedom of the press, pulpit, and speech?" or "Why can we not proceed to socialism through education and the ballot?" are meaningless in that they contain contradictions in the logic of social dynamics.<sup>11</sup>

We must then limit our ambitions. We shall be content for the present to point out certain necessary relationships between underlying dynamic fields and social phenomena. Our predictions beyond those of necessary relationships will be concerned only with direction rather than amount of social change. In the constructive method, mathematics is essential. Modern physics is based on a mathematics which deals with both direction and magnitude. Social psychology for the present must content itself with relationships which are defined without magnitude and in terms of limitation in possible directions. Such a mathematics exists in *topology*. Topology is that part of geometry which deals with the non-metricized and non-directional aspects of spatial relationships. Topology investigates the "belongingness" of certain positions to certain spatial regions.

Recently Lewin (26) has indicated that many problems of psychology can be handled by being ordered to the construct of the psychological field.<sup>12</sup> He has further shown that certain properties of fields may be defined topologically so that one may *deduce* certain forms of behavior *purely mathematically*. Lewin speaks also of the applicability of these concepts to sociology and social psychology. Lack of space forbids our development of Lewin's mathematical

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<sup>11</sup>In order to avoid a possible misunderstanding, I wish to emphasize that this is *not* yet demonstrated in this paper.

<sup>12</sup>K. Lewin (27). It is to be hoped that interested readers will refer to Lewin's deductions. An earlier suggestion of the applicability of topology to biological problems is to be found in Thompson's outstanding work (40). Thompson's book is in many ways the most important biological treatise published in the twentieth century. It represents certainly the first field-theoretical approach in morphogenesis.



treatment in these papers. Here we simply wish to point out that some of the concepts which we shall soon introduce may be mathematically defined and interrelated in terms of exact mathematical-logical deduction. These we shall call topological concepts. Certain other terms which we must use are not yet to be treated in terms of pure mathematics, but it is our belief that such a treatment will be quite possible in the near future. These we shall call *non-metricized dynamical concepts*.<sup>13</sup>

Before we define the concepts which we shall use in developing a social psychology, we must emphasize *again* that certain of them are already to be deduced mathematically. Since this is so, the field-theoretical approach in using topological concepts is not concerned with analogies nor with models in the nineteenth-century use of these words. Analogies and models are pedagogically important and sometimes even clarify the investigator's own thinking. The concepts we use do more than this. Where they are applicable (and the fields to which they are applicable are daily increasing in number), one can use them as precisely defined concepts to build working hypotheses, and hence as the starting point of the hypothetical-deductive method. Where they are applicable they allow us to predict with the surety of the physicist, although the work before us is much heavier and we can still be excused a certain jealousy of that more fortunate scientist.

## 2. *The Concept of the Social Field.*

a. What occurs at any locus within the field is determined by the structure of the field. By *field structure* we mean the spatial-temporal configuration of energy expressed in the language of constructs. The idea of the field is itself a construct. By the social-field structure we mean the distribution of energy behind specific social behavior or the behavior of groups. Social behavior of individuals or the behavior of groups may be analyzed in terms of a physical field,<sup>14</sup> an ecological field, a psychological field, or a social field.

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<sup>13</sup>The history of science abounds in cases where scientists have had to wait for the mathematicians to develop necessary tools. Seventeenth century mechanics had to wait on Newton's invention of the method of fluxions. More recently Schroedinger had to revamp Hamilton's mechanics before he could develop wave-mechanics. At the present time topology has also become important for physics.

<sup>14</sup>This is the program of Neurath (34). I believe such a demand



The advantage of limiting our construct to the social field is that certain predictions can be advantageously made without a characterization of the total existent physical, biological, and psychological variants in the field. It is important, however, that physical and biological variants which directly affect social behavior be adequately characterized.

*b.* The sociological significance of the field-concept is that the behavior of the individuals within the field is defined by vectors within the field, and is not locally determined. The forces activating individual movement, whether these have a physical concomitant or not, are not to be localized in the individual. We shall speak of these vectors as *lines of field force* in the social field.

*c.* The social field has the type of reality possessed by the gravitational field.<sup>15</sup> Both represent constructs. The gravitational field, however, roughly coincides with normally perceived physical space. It is important to insist that the idea of a constructed field is not a picture or diagram showing the physical position of individuals in physical space. As Lewin points out, the space concept used by modern mathematicians is far removed from that of geometrical optics. Space may be curved or may be  $n$ -dimensional. Modern geometry is concerned with mathematical relationships which may not even be capable of representation in terms of visual experience. Although in some cases the social field is closely related in its spatial characteristics to the physical field in which the members of the group are acting (as when a mob storms a jail in connection with a lynching), in more cases this relationship is lacking. If one considers the nation as a social group, the field includes nationals living abroad, who as loci in the national field are determined in their activity by changes in the structure of the field. Furthermore, the lines of field force may be directed towards objects like God, which have no physical but great social reality. Finally it is meaningful to speak of "locomotions"<sup>16</sup> in the social field such as penetrations

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is methodologically good *idealism* but probably poor practice. As Wheeler has pointed out, every behavioral event is a physical, biological, psychological, and sociological problem.

<sup>15</sup>We are not concerned with the nominalism-realism problem of modern physics here. The social field may be a "fiction" in the sense of E. Mach (27) and H. Vaihinger (41), but if it is, it is no more of a fiction than the gravitational field.

<sup>16</sup>Locomotion may be topologically defined. Cf. Lewin (27). One speaks of what locomotions are possible in certain topological regions.

of certain sections of the proletariat into the bourgeoisie. The physical correlates of such locomotions, if they may be given at all, may only be given in a very circuitous way. The social field then, represents a construct in the modern mathematical rather than the model or pictorial sense.

d. Practically, we are forced to abstract certain types of behavior from the general social field in order to deal with social behavior at all. Every individual has *membership-character* (cf. below) in a number of such abstracted fields—nation, class, religion (usually), etc. The question arises, is such abstraction justified? This problem is not a new one to science. Each physical event is concerned with objects which are electron-proton aggregates, showing certain chemical, mechanical, thermodynamical, and photoelectrical behavior. The physicist in making analysis for practical reasons abstracts certain aspects of this behavior, let us say the mechanical, to study separately. In studying the mechanical behavior, he must control or hold constant certain at least of these other aspects of behavior. In the history of physics, the macroscopic laws of mechanics were discovered first and without any reference to microscopic laws. Today physicists are very close to being able to deduce macroscopic properties from microscopic field structure. It seems to the writer that we have used the supposedly greater complexity of biological phenomena as a lazy excuse for an inadequate biology. We very much doubt, as a matter of fact, if biological phenomena are more complex than physical phenomena.<sup>17</sup> Our problem is the abstraction for study of certain forms of behavior from the total social fields. We must further include in our characterization of the field all those properties of other fields which may influence behavior in the field under consideration. Furthermore, we shall begin by treating each individual as an undifferentiated *point-region* (cf. below) in the social field. This is certainly not true, but as a first approximation to reality, in the hope of finding certain macroscopic laws, it can be justified. Such macroscopic laws will never explain the behavior of each individual of the group. The subject matter of social psychology in terms of a field-theoretical approach seems to us to be the study of how the structure of the social field

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<sup>17</sup>Modern theories of atomic structure are certainly just as complex as Morgan's interpretation of the gene. Cf. also the very pertinent remarks of Wheeler (43, pp. 65-68).

affects the individual psychological field and vice versa. Sociology may neglect the individual psychological fields and still remain a necessary and autonomous science, even if for the present it can only hope for macroscopic laws and topological predictions. We shall next discuss the nature of the variable factors of field structure.

### 3. *The Topological and Non-metricized Dynamic Factors in Social Field Structure.*

a. *Region.*<sup>18</sup> Region is the basic concept of social space. Social fields are regions, and individuals within them also represent regions. Regions vary topologically in that they are bounded or unbounded, limited or unlimited. In the present work we shall be concerned only with limited regions which may be either bounded or unbounded. Figure 1a indicates a limited unbounded region. 1b



1a



1b

indicates a limited bounded region. Both contain a series of point regions. Regions also vary in their *differentiation*. The point regions so indicated show no differentiation. These point regions are the topological constructs representing individuals in the social group. To treat them as undifferentiated is only a first approximation. Figure 1a is the simplest topological description of a social crowd without organization and having high mobility. It represents the type of crowd one would find on a summer evening in a public park. Such a crowd is *ordered* to the social field, when we say the field is a limited region of point regions without boundary.<sup>19</sup> Figure

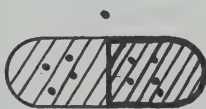
<sup>18</sup>Cf. Lewin (27). The following factors and definitions are largely those of Lewin. In some cases, I have modified or added to them as was necessary in a non-mathematical work. After this paper had gone to press I discovered from conversations with Professor Lewin that his use of the constructs *fluidity* and *tension* varies somewhat from mine.

<sup>19</sup>The *illustrations* are not intended as field dynamical analysis of specific problems. I emphasize again even at the risk of repeating myself that any field characterization is valid only for a specific concrete and momentary condition of society. We shall try such a *real* analysis in the next section.

1*b* is the simplest topological description of a social group organized for any definite purpose, say an evening party. Such a group is ordered to the social field when we say the field is a limited region of point regions with a boundary. A group of people making up an evening party can only be represented as *bounded* because an individual in entering the group acquires definite *membership-character* (cf. below) in crossing the boundary. A stranger can come and go at will (i.e., can follow arbitrary "locomotions") in the park crowd but not in the social group.

*b. Locomotion.* By locomotion is meant change of topological position within a region. The degree of freedom of locomotion is determined by *boundaries* and by the *fluidity* of the field. In the above example, where there is no boundary, individual locomotions within and without the region have an unlimited degree of freedom. The boundary immediately limits the possibility of movement. Boundaries, however, vary dynamically in their permeability.

*c. Membership-character (Zugehörigkeit).* All individuals in a *bounded* region have membership-character in this region. Membership-character is the pattern of social and psychological characteristics acquired by an individual through belonging to a group. Mathematically all points in a topological region have membership-character (*Zugehörigkeit*) in this region. Hence, all Catholics, all Americans, and all factory workers have membership-character in different regions of the social field.<sup>20</sup> Figure 2 is the simplest field-theoretical description of congregations of four Catholics, four Protestants, and one atheist. The heavy-lined region represents the



II

<sup>20</sup>To avoid becoming too involved in the sentences, in this early paper I have here and in the following paragraphs to a certain extent committed the crime of mixing the language of constructs and the language of data. Strictly speaking instead of referring to Catholics, etc. with "membership-character in different regions" one should say "individuals (point-regions) possessing such and such properties as a result of membership-character in such and such regions." I believe, however, that my readers will be able to avoid becoming confused.



lesser *fluidity* (cf. below) of the Catholic church, the lighter-lined region the greater fluidity of the Protestant church, and the vacant area the field of the atheist. The characterization, of course, only holds for religious behavior at a given time. The boundary surrounding the Catholic region is less permeable (indicated by the heavier line) than that surrounding the Protestant region. Other things being equal it is more difficult to obtain the membership-character of the Catholic church than the Protestant. Furthermore, the regions are adjoining since it is sociologically possible to change from Catholicism to Protestantism without "losing faith."<sup>21</sup> It is possible, however, to lose faith and then regain another faith. Such a *locomotion* would mean crossing two boundaries rather than one.

*d. Variation in membership-character and regional fluidity.* The point-regions (individuals) have the properties of things, while the regions in which they are imbedded have the properties of media (15). The medium may be said (in terms of a non-metricised dynamics) to vary in its fluidity. Locomotions in less fluid media are more difficult than in more fluid media. In the Catholic region (Figure 2) we have indicated a less fluid medium. This is the field-theoretical characterization of the phenomenal fact that one must conform more to dogma in the Catholic than in the Protestant church. To say that the religious membership-character of the Protestant churches shows a greater variation than that of the Catholic church is another expression of this. The relative sameness in the aims, ideals, and goals of individuals in certain social situations gives them the same membership-character. This sameness is only relative, however, and may show variation. This variation is always correlated with the fluidity of the region. Hence, Americans today show more variation in membership-character and are to be ordered to a more fluid region than either the Germans under Hitler or the Russians under Stalin. At the same time temporal change is

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<sup>21</sup>The boundary permeability is not necessarily easily reversible. Membranes are usually not reversibly permeable any place in nature. Physical chemistry gives many examples of this. Psychologically it is often easier for a Catholic to "lose faith" than it is for him to become a Protestant. Stephan Dedalus answers the query, is he going to become a Protestant, "I said I had lost faith but not that I had lost self-respect. What kind of liberation would that be to forsake an absurdity which is logical and coherent and to embrace one which is illogical and incoherent?" (James Joyce, 17).



indicated by the fact that under Roosevelt and the N. R. A. the variation in membership-character is lessening and so is the fluidity of the region for the U. S. A. This is indicated in Figure 3. This,



U.S.A. 1925



Russia 1934



U.S.A. 1934



Germany 1934

## III

however, is only an approximation, because the dynamic forces at work in Germany and Russia are quite different and the class ruling each country has a quite different goal in the social field. Here again it must be emphasized that by the region we do not mean "in the country." There are Communists in Germany and Capitalist saboteurs in Russia, who are topologically without the boundaries of the national region.

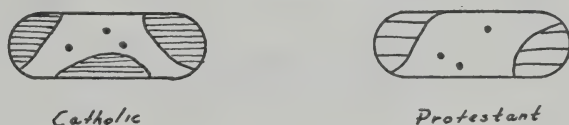
*e. Boundaries.* It has already been indicated that regions are limited by boundaries and that boundaries vary in their permeability. Furthermore, once within a boundary a point-region has by definition membership-character in that region. Boundaries vary (in terms of a non-metricized dynamics) in their permeability. The American region, up to the period of the great war when immigration was practically unrestricted, was limited by a highly permeable barrier. This barrier at the time of writing is most impermeable. The permeability varies also with different national regions. Hence, not only today but at all times the permeability has been greater to certain other nationals, for instance Canadians (Figure 4).<sup>22</sup>

<sup>22</sup> Instead of decreasing permeability additional boundaries may be set up around regions. The prospective immigrant must be sane, healthy, have certain reserves of money, etc. Each one of these as Lewin (27) has pointed out may be considered a separate boundary.



## IV

f. *Barriers*. Even within definite social regions not all *locomotions* are equally attainable. The point-regions are limited in their degree of freedom of locomotion by various *barriers*. These barriers represent regions, more or less differentiated, which are themselves bounded. *Barrier* and *boundary* represent mathematically synonymous terms. In the following, however, we shall use *boundary* to refer only to the region separating regions of different membership-character, and *barrier* to refer to limitations of degree of freedom of locomotion within the region. Barriers are the topological characterization of the social forces such as laws, customs, mores, taboos, and the like which are operative within a certain region. In the Catholic church these are more numerous and ordinarily less permeable than in the Protestant (Figure 5). The

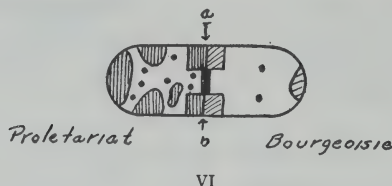


## V

Catholic must eat no meat on Friday, must attend mass on Sunday, and must go to confession at certain periods. The obligations of the Protestant are less strict. The permeability of barriers varies with the structure of the field. When the Catholic is travelling, for instance, his obligations are lessened, i.e., he does not have to abstain from meat at all costs, etc.

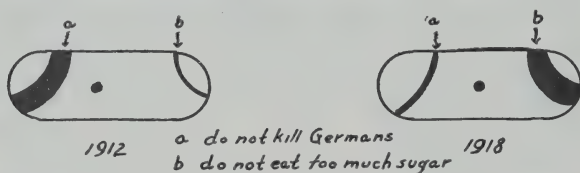
Different "class" regions also show different structure with regard to the abundance and permeability of the barriers. The proletariat on the whole has more numerous barriers which are less permeable than the bourgeoisie. Under certain conditions, these have become so numerous and impermeable that there has been an explosive pene-

tration through some of them. This is the underlying dynamic situation behind a revolution. The topology of proletariat and bourgeoisie is indicated in Figure 6. In this diagram *a* and *b* represent



barriers to both proletarian and bourgeois. Such barriers are, however, more permeable to the bourgeois than the proletarian. (If he is late for work, the bourgeois may hire a cab; if he is arrested, he can get bail, etc.)<sup>23</sup>

Also barriers and their permeability vary with functional changes in the structure of the field. In the situation of lesser fluidity, which, as we shall see, always occurs in a war, certain barriers become decidedly more permeable, others less so. Figure 7 indicates the



VII

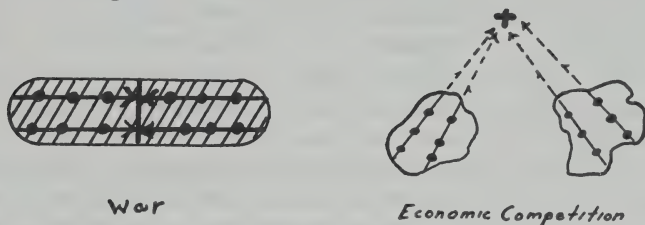
changes in the permeability of the topological barriers representing the taboos against killing Germans and against eating too much sugar in the late war.

*g. Tension and its direction.* Tension is a non-metricized dynamic concept used to indicate the direction of social locomotions. The individual point-regions behave in the sociological field within tensional situations. This is a problem of individual psychology, which we shall not discuss further here.<sup>24</sup> Under certain conditions

<sup>23</sup>Quite similar is the underlying topology of the two races in the Southern states of the U. S. A., etc.

<sup>24</sup>For a discussion of the rôle of tension in individual behavior, cf. Lewin (27).

the whole social region, however, may be under tension to expand its boundaries. In terms of dynamics, we say the regional boundaries are expanding in a similar but not directly opposed direction in competition. When the direction is directly opposed, we have the underlying dynamics of the conflict situation. This difference between the structure of the social field in economic competition and war is indicated in Figure 8.



## VIII

This completes the topological and dynamical factors which we shall use in attempting a field-theoretical approach to sociology.

## IV. SOCIAL GROUPS AS FIELDS

We shall now give a field-dynamical analysis of the single problem which is, if not the most important problem of social psychology, the oldest and most discussed, viz., the problem of a "group" turning into a "mob." This can best be done after a brief outline of the history of the group-mind concept.

1. *The Group-Mind Concept.*<sup>25</sup> Academic social psychology, which arose in the latter part of the nineteenth century as a borderline discipline of sociology and psychology, has been concerned through its brief history with one very important controversy, namely the controversy over the reality or lack of reality of the group-mind.<sup>26</sup> The controversy over the group-mind is, as a matter of

<sup>25</sup>Cf. Karpf (18) and Sorokin (37). I am not interested in presenting a detailed historical analysis here, but simply in clarifying the use of the group-mind concept methodologically.

<sup>26</sup>Methodologically the "group-mind" as it is called by McDougall plays, as I hope to show, the same rôle as LeBon's "collective mentality," Durkheim's and Levy-Bruhl's "representations collectives," etc. Although all

fact, a special question of the larger controversy between psychology and sociology concerning the reality of social groups and hinging on the general problem of whether sociology or psychology was to be looked on as the basic social science.<sup>27</sup> Some psychologists have always felt that it is the province of their science to deal with human behavior in all its aspects. On the other hand certain sociologists have insisted not only on the reality but on a certain priority of social groups as showing forms of behavior which could only be handled in terms of a separate science. The question, "Are groups real entities (in a methodological sense) which cannot be explained from the psychology of the individuals composing them, or are they to be so explained," is even today much debated.

The question as posed is rather a meaningless one. The problem disappears, as we shall see, when we look on groups from the point of view of field theory. Before we do this in detail, let us state certain facts which would, we think, be granted by all investigators. That individuals do exist in social groups is indisputable.<sup>28</sup> Equally indisputable is the fact that individuals are moulded in their tastes, aims, manners, and morals by the social group into which they happen to be born, by the groups in which they obtain *membership-character* during their lifetime. On the other hand, man is a biological species. The human nervous system and its mode of functioning impose limitations on the modification of human behavior by a social group. In perception, for instance, there is the range of perceptual sensitivity, in cognitive behavior the limitations imposed by the individual's IQ, in motor behavior the limitations imposed by physiological fatigue and such factors. It will not be our purpose here to say exactly what limitations are placed on the modifiability of human behavior by the fact that man belongs to the species *homo sapiens*. One thing is certain: *these limitations are*

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adherents of the "group-mind" theory pretend to be "organismic" in their attack they actually represent a spurious form of the organismic concept. The "group-mind," as we shall show, is a vitalistic rather than a configurational type of theory and hence represents no real advance from the atomistic-mechanistic sociology of the eighteenth century, i.e., the theory of social contract.

<sup>27</sup>A Comte as a systematizer placed sociology first. H. Spencer's (38) *Principles of Sociology* follows his *Principles of Psychology* in his "Synthetic Philosophy."

<sup>28</sup>Groups may even have evolved as groups, certainly no one today holds the "social contract" theory in any form. Cf. Kunkel (21).



*not as great as previous thinkers have believed.* A single example must suffice. The earlier investigators believed that the intelligence quotient was completely determined in the germ-plasm. Recent researches have indicated that very modest changes in the environment (what we should call the social-psychological surrounding field) are able to change the IQ by an appreciable amount. What a really radical change in the environment might do is a problem for the future.<sup>29</sup> But it seems increasingly likely that the old heredity-environment dichotomy is meaningless. Biological scientists have already changed the wording of the question, "How much is due to heredity, how much to environment?" to the question, "To what extent can environment modify heredity?" We believe that the biological science of the future will speak of what we now call hereditary traits as the resultants of the embryological field structure. Resultants of the embryological field are now very constant because we have not the ability to manipulate (cf. p. 192) forces in the embryological field. It is by no means certain that we shall never have this ability.<sup>30</sup> The chief findings of modern biological research all indicate that *any attempted isolation of the individual from the group or consideration of the group as independent of the individuals composing it is impossible.* Neither psychology nor sociology may be looked on as autonomous sciences. If there is a basic social science, it will be called social-psychobiology.

We may now see why the problem of the "group-mind" had to arise as a particular problem of social psychology. Since the social group determines to a large extent the individual's goals and beliefs and hence his behavior, it is necessary to set up some concept to represent those beliefs and goals which are shared in common by the individuals in the group. The sociologically minded writers have filled this need with the concept of the group-mind.<sup>31</sup> Although the definition of the group-mind varies with different writers, methodologically it always plays the same rôle. It is a "class" concept, having the properties of an entelechy rather than a vector

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<sup>29</sup>Cf. the remarkable experiments on identical twins reported to the annual meeting of the American Psychological Association by McGraw (32).

<sup>30</sup>Cf. the work on experimental embryology of Child (7), Dürken (10), and others.

<sup>31</sup>For instance, McDougall (31), LeBon (22), Levy-Bruhl (23), Wallis (42), et al. Cf. Folsom (12).

—something superimposed on the mind of the individual. This superimposition occurs automatically when, and only when, the individual enters the group.

Now, for reasons which should be obvious to the reader, certain psychologically minded writers<sup>32</sup> have denied the existence of any such mechanism over and above the individual minds within the group. They have said that the group-mind represents the positing of unobservable and intangible forces very much like the *élan vital* of the vitalist. In this criticism they are certainly right. But here again we meet the problem with which we started—that of organization. The individual's attitude is affected by his belonging to groups. Organization cannot be explained by a social-psychological atomism. Denying a problem does not solve it. Here again recent researches rather than making the problem of organization seem less important have made it seem more so.<sup>33</sup> On the other hand, postulates like the group-mind are class concepts and hence not "good" scientific theory. The problem of the group-mind is an integral part of the controversy as to whether sociology or psychology is the basic science. It is even to be looked on as a part of the even larger problem of organization in nature and the debate between the atomistic-mechanists and the vitalists. The atomistic-mechanists do not meet the problem of organization, and the vitalists solve it in a completely spurious fashion. The exponents of group-mind are to be reckoned with the vitalists. The psychologists who deny it are to be reckoned with the atomistic-mechanists, although certain individuals like Dewey and MacIver seem aware of the problem.

It would be interesting to trace the variants in group-mind theory and to see how well the different writers fulfill the criteria for class or for field theory. We shall, however, have to content ourselves with pointing out definite shortcomings in the work of LeBon (22), McDougall (31), and Freud (13). Knowledge of their theories is of necessity presupposed on the part of the reader.

Lebon's use of the phrase "collective-mind" shows clearly that he is thinking in terms of a class theory. From an empirical study of crowds he abstracts certain of their behavioral properties and

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<sup>32</sup>For instance Allport (1), Dunlap (9), MacIver (28), Ginsberg (14), *et al.*

<sup>33</sup>Cf. Folsom (12).

when a group assumes these properties, he considers the behavior explained when he says: the individual mind has been replaced by the "collective mind." He is hence thinking in dichotomies. Furthermore, LeBon's own political faith is that of the aristocrat, and he deplors the "age of crowds." Consequently, he uses valutive concepts. His method is empirical, i.e., he has observed some crowds and read of many more, rather than being hypothetical-deductive. The collective mind is a substantial concept.

McDougall's treatment of the group-mind represents a definite step towards a more scientific analysis, but one which still retains most of the earmarks of a class theory. The "group-mind" and "group purpose" are *class-determined entelechy concepts*. The analysis remains substantial and the thinking is in terms of dichotomies and valutive concepts. McDougall, however, in considering the organized group definitely enlarged the concept of group behavior. His dichotomies are also less marked and his use of valutive concepts less blatant than LeBon's. But withal McDougall is a "class" theorist.

Freud's treatment of the crowd, despite obvious limitations, represents a real scientific advance. The dichotomy between crowd behavior and individual behavior practically disappears. Freud is remarkably scientific in his lack of valutive concepts and dichotomies. He uses (but inadequately) the hypothetical-deductive method. He posits nothing over and above the individual minds to explain group behavior but explains it instead on the basis of libidinal attachments between the members of the group. He points out that despite the orthodox opinion panics and mobs are dynamically very opposed types of social phenomena. But Freud's *use of the libido concept is to be classified as "class" as opposed to "field" theory*.<sup>34</sup>

## 2. *Field-Theoretical Analysis of a Definite Case.*

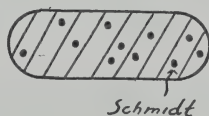
a. *Phenotypic description (language of data)*.<sup>35</sup> In the year 1918, a crowd is gathered in front of the newspaper office in an American town. In this group, feeling somewhat socially isolated,

<sup>34</sup>For a further methodological analysis of Freud's thinking, see Brown (4).

<sup>35</sup>I submit a fictitious case in order to illustrate certain points of the method. Many such events did occur in 1917-1919.

is Johann Schmidt. (Born 1870 in Mannheim, Germany, he came to the U. S. A. in 1900, and has lived industriously and quietly as a grocer in this town, a decent citizen belonging to the Lutheran Church, etc.) At the present time Schmidt is under surveillance of the Department of Justice, must report at certain times, cannot go to certain places, etc. Previously he has been on friendly terms with all the members of the group. Today he retains a speaking acquaintance with most of them, but he is regarded suspiciously. He is also waiting for bulletins on the outcome of the hostilities. A new bulletin goes up: "The Troop Ship — has been sunk by a German submarine with the loss of 400 American soldiers." Much conversation, an individual starts haranguing, "This fellow Schmidt, I think at heart sympathizes with the Kaiser." Schmidt has withdrawn and has started for his store. "Let's show him that America means business." "Come on, what are you guys afraid of?" "Maybe some of our local boys was on that troop ship." "The dirty Huns." The crowd, now a mob, starts towards Schmidt's store. Bricks are thrown through Schmidt's windows. He is called unprintable names. Some one says, "Schmidt's all right, he can't help it, he's really an American." This someone gets someone else's fist on his nose. "You're a Hun too." "Oh no I'm not." And to prove that he is not, Schmidt's one defendant throws a last brick. Schmidt's store is ruined, and the mob goes home.

*b. Genotype description (language of constructs.)* The crowd gathered before the newspaper office is ordered to a social field of fairly high fluidity enclosed by a very permeable barrier. Even a stranger, providing he did not start singing "Deutschland über Alles," could get into it. All the individuals including Schmidt have membership-character in this field. The membership-character shows considerable variation which is concomitant with the relatively high field fluidity. All the individuals (point regions) are under tension (i.e. they are waiting for news of the hostilities.). The field is characterized topologically by Figure 9.





The news acts as a force from without which causes a decided drop in the fluidity of the field. The permeability of the boundary is greatly diminished. Schmidt in this restructurization (Figure 10) loses membership-character in the region. Socially he then represents a separate bounded region.<sup>36</sup> The variation in membership-character is diminished, as it always is in less fluid fields. The tension becomes directed against Schmidt and the whole field is under expansive tension in his direction.<sup>37</sup> This tension becomes so great that the barriers separating Schmidt are penetrated and the act of violence is accomplished. The fall in variation of membership-character and the decrease in the permeability of the boundary makes the attempt of the individual to protect Schmidt dynamically impossible. In the region of high fluidity, kind words about Schmidt are possible. Under the lowered fluidity they are not. Figures 9 and 10 represent simply two momentary situations in a continuously changing dynamic field. An outside force (the news of the sinking of the troop ship) lowers the fluidity of the field and concomitantly the individuals become aligned in lines of field force with Schmidt's person as a goal. The transition from the situation of Figure 9 to the situation of Figure 10 is a temporal process of



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restructurization which cannot be diagrammatically represented except possibly cinematographically.

A description in terms of the underlying genotype allows us to deduce the phenotypical behavior of the group by the logic of dynamics. The variation in membership-character which is possible in the first situation is not possible in the second. From this follows the inability of any individual to support Schmidt and still

<sup>36</sup>The problem of the change in Schmidt's personal psychological field cannot be handled in an analysis which considers the individual as a *point region*. At a later time I hope to make such individual psychological analyses.

<sup>37</sup>Social rather than geographical meaning.



retain membership-character with the group in the second situation. The boundary separating Schmidt in the second situation is a social one without physical concomitant. In terms of the dynamics of social fields, however, the situation is genotypically the same in the case of a lynching. When a mob storms a jail in a lynching, however, the barrier has a physical concomitant. This barrier requires greater tension to be penetrated. This may account for the more brutal outcome of the lynching.

It should be obvious that such an analysis does fulfill the criteria set up for the field-theoretical approach. Furthermore, the various characteristics of mob behavior given by writers on this topic may be deduced from the dynamic characterization of the underlying genotype.<sup>38</sup>

## V. SUMMARY AND CONCLUSIONS

We conclude that social groups do show the properties of structured fields and are amenable to treatment by the concepts of the logic of dynamics. We conclude this on the factual as well as the methodological grounds outlined in this paper. At the present time there is a rather general agreement among social psychologists that groups represent "organic wholes." There is, however, considerable variance in opinion regarding the properties of organic wholes. We submit that organic wholes show the properties of structured fields as outlined in this paper.

In this paper we have tried to show:

1. That the organismic philosophy of biology, the hypothetical-deductive method, and the language of constructs are related in what has been called the field-theoretical approach to science. This approach is scientifically the most valid.
2. That contemporary sociology and social psychology have no theories which fulfill all the criteria for the field-theoretical approach.
3. That from the standpoint of field theory social psychology may make topological and non-metricized dynamical analyses with the construct of the social field.

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<sup>38</sup>For instance, LeBon's (22) characteristics of the sense of power, the contagiousness, and suggestibility of crowds; McDougall's (31) enhancement of the patriotism in the group; the characteristics given by E. D. Martin (30). Lack of space prevents us from deducing these characteristics in detail. It is my hope that the reader will do this for himself.

4. That the variant factors in the structure of the social field are: (a) region, (b) locomotion, (c) membership-character, (d) its variation, (e) boundaries, (f) barriers, (g) tension.

5. That social groups may be ordered to the construct of the social field.

6. That the problem of a "crowd" becoming a mob may be handled field-theoretically.

7. That when it is so handled the behavioral characteristics may be deduced from the field structure.

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## VERS UNE THÉORIE DE LA DYNAMIQUE SOCIALE

(Résumé)

On considère la théorie pratique ("field theory") basée sur la philosophie organismique de la biologie, la méthode hypothétique-déductive, et le langage des constructs comme l'approche la plus juste à une psychologie sociale scientifique. L'auteur examine diverses théories de la psychologie sociale et ne trouve aucunes qui satisfassent les critères qu'il a établis pour une approche théorique-pratique. Il définit ensuite le champ social et discute les variantes dynamiques topologiques et non-mesurées dans sa structure. Les concepts de région, fluidité, limite, barrière, caractère de membre ("membership character"), et direction de tension premièrement employés par K. Lewin pour la psychologie individuelle sont appliqués aux problèmes sociologiques et sociaux-psychologiques. Le problème d'une "foule" qui devient une "multitude désordonnée" est sujeté à une analyse théorique-pratique. On conclut que la méthode serait également applicable à d'autres problèmes sociaux-psychologiques et que les groupes sociaux peuvent être traités selon la méthode théorique-pratique. On suggère que cette approche pourrait fournir une psychologie sociale de valeur scientifique.

BROWN

## NACH EINER THEORIE DER SOZIALEN DYNAMIK HIN

(Referat)

Eine Feldtheorie, die auf die organismische Philosophie der Biologie, die hypothetisch-deduktive Methode, und auf die Sprache der Konstrukte gegründet ist, wird als die gültigste Annäherung an die wissenschaftlich-soziale Psychologie betrachtet. Der Autor untersucht die verschiedenen Theorien der sozialen Psychologie und findet keine, welche die Kriterien erfüllt, die er zur feldtheoretischen Annäherung aufgestellt hat. Er definiert dann das soziale Feld und bespricht die topologischen und nichtmetrischen dynamischen Varianten in seinem Aufbau. Die Begriffe von Gebiet, Flüssigkeit, Grenze, Barriere, Zugehörigkeit, und Spannung, die zuerst von K. Lewin für individuelle Psychologie gebraucht waren, werden auf soziologische und sozial-psychologische Probleme angewandt. Das Problem des Uebergangs von einer Menge Leute zu einem "Mob" wird einer feldtheoretischen Untersuchung unterworfen. Es wird gefolgert, dass die Methode sich ebensogut auf andere Probleme anwenden lässt und dass soziale Gruppen feldtheoretisch behandelt werden dürften. Es wird vorgeschlagen, dass eine solche Annäherung eine wissenschaftlich gültige soziale Psychologie verschaffen könnte.

BROWN

# AN EXPERIMENTAL TEST OF TWO THEORIES OF SOCIAL SMILING IN INFANTS\*<sup>1</sup>

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## INTRODUCTION

The young infant frequently smiles at the human adult (1, 5). Two theories seek to explain this fact. One of these theories is that the human form and voice are themselves the native causes of smiling (1), and hence no explanation in terms of the social experience of the infant is necessary. A second theory supposes some other unconditioned stimulus to smiling and holds that the form and the voice of the adult become effective because of their association with the original stimulus. Preyer (6) supposed the original stimulus to be a condition of satiety; Watson (8) claimed that contact stimuli were the most effective.

It would seem that these theories might be put to an experimental test. If so, what are the requirements of the experiment?

The theory last mentioned holds that the effectiveness of the human stimulus is derived from its temporal association with another stimulus. Now if this is true, one should be able to find the supposed unconditioned stimulus. One should also be able to demonstrate that the unconditioned stimulus is effective at an earlier date than are the human form and voice, since the latter supposedly acquire their effectiveness only after they have been presented in conjunction with the native stimulus. The test of this theory obviously lies in attempting to determine whether these expectations are met.

The first theory holds that association of the infant with human beings is not essential to the development of social smiling. The obvious approach is to prevent such association, at least in part, and to test for social smiling at the appropriate time.

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<sup>1</sup>I wish to acknowledge the aid of the Institute for Research in the Social Sciences which was indispensable to this research. It will be obvious from the text that Mrs. Dennis was also an indispensable factor. I wish to express my appreciation to Dr. L. T. Royster and to Miss Rose Williams of the University of Virginia Hospital for their many kindnesses.



The two experiments may be combined by studying the development of smiling to the human *face* under normal conditions at the same time that *vocal* stimulation by the adult is controlled.

I have made a first attempt at such an experiment with a pair of fraternal twins. Mrs. Dennis and I reared the infants in a laboratory room in our home with full experimental privileges from day 36 to day 428. The general experimental conditions have been described elsewhere (4). I shall review here only the conditions which seem most pertinent to the development of social smiling, which in this paper is to be traced only to day 112.

The experimental plan was briefly as follows: Between days 36 to 48 we merely fed and cared for the infants without experimentation, permitting them to become adapted to a new feeding schedule and a new routine. From day 48 until day 82 stimuli were presented which tested, among other things, the sensory control of smiling. The stimuli were divided into three series to be described later. From day 82 until day 112, the close of the period here reported, no experiments were performed, but records were kept of the responses of the infants to their usual routine contacts with the experimenters.

The routine care of the infants from day 36 to day 112 was as follows: We fed and bathed the infants and kept them dry and clean. We did not smile at them, talk to them or play with and fondle them. Except when being handled or when being subjected to experimental stimuli, the subjects lay on their backs in their cribs, which were separated by a screen. While the experimenters spoke to each other freely at all times, the twins were not addressed and we attempted to prevent any association between our speech and the care of the subjects. Notes of the babies' behavior were taken each time that we entered the room for any purpose.

## RESULTS

From day 36, when the subjects were brought into our home laboratory, until day 48, when the first experiments were begun, the twins were observed to smile a total of 18 times. The smiles were divided among several situations as follows: tactual stimulation of the lips or chin incident to feeding, 9; in crib, eyes on the experimenter, 6 (three of these were immediately after feeding); asleep, 2; after feeding, not fixating E, 1. When we consider that the infants

were fed six times each day, or a total of 72 times each from day 36 to 48 it will be seen that smiling in association with feeding and at the human adult was far from invariable. Likewise no other situation incident to routine care elicited smiling with any regularity.

From day 48 to day 82, Experimental Series I, II and III were carried out. Series III, a series in which the stimuli were largely noxious taste substances, called forth no smiles whatsoever and requires no further mention in the present article. Series I and II contained several situations designed especially to test smiling. Since these series will be described in full in another report it is not necessary to describe them in detail here. They included patting the child on the chest (30 secs.), tickling the child lightly under the chin (10 secs.), tickling the child lightly in the ribs (10 secs.), leaning over the baby and smiling at her (30 secs.). Each situation was presented 20 times to each subject, a total of 40 times. The experiments followed soon after a feeding and were never performed twice in one day. Reactions were recorded for the duration of each stimulus. To 40 presentations of the stimulus of patting on the chest, 9 smiles occurred. This was the most effective stimulus so far as smiling was concerned. The next most effective situation, bending over the crib and smiling, was followed by a return smile 6 times. The difference between the two stimulating situations is of course unreliable. The stimulations by tickling the neck, and tickling the ribs were followed by 5 and zero smiles respectively. Furthermore, many of the stimuli of Series I and II which were not designed to elicit smiling were followed by a smile nearly as commonly as those listed above. The application of asafoetida to the nostrils was followed by smiling in 4 cases. It is likely that the effective element in the stimuli which did arouse smiling was the fact that E bent over the reclining infant. Of a total of 46 smiles which occurred in the course of Series I and II, 39 appeared when E was bending over the crib to apply a stimulus. That is, even at this early age there was no indication that any situation was more effective in eliciting smiling than was the sight of an attendant bending over the crib. Patting and tickling the child were not reliably more effective than this.

The sight of the attendant gradually increased in its effectiveness. Since our routine procedure was relatively constant and we were

constantly on the lookout for smiling the number of smiles recorded in our notes probably represents the real change in the frequency of social smiling. I have called "social" all smiles which occurred when the infant was fixating the face of one of the experimenters. Omitting those which occurred during the experiments, since they are the result of extra stimulation, the total number of social smiles per week from day 50 (beginning of the 8th week) through day 112 (end of 16th week) were as follows: 0, 3, 8, 2, 10, 9, 8, 25, 31. The increase in *social* smiling was the only increase in smiling which occurred. During this period Rey was never observed to give a non-social smile; Del was observed in seven. The increase in social smiling cannot be interpreted as an increase in smiling during or after feeding or to contact for practically all of the smiles from day 48-112 occurred as E bent over the crib to pick up the baby or to dry the baby, *but before the baby had been touched*. During this period only 8 smiles (Rey 2, Del 6) occurred during, or within a few minutes after, feeding. The others occurred *before* feeding or when E entered the room for some other purpose than to feed the infants.

The increase in smiling at E, it has just been shown, was not accompanied by an increase in smiling at other objects. It must be admitted that at the period under consideration the babies fixated E a large part of the time that he spent in the room observing the babies and that this detracted from E's opportunities to observe non-social smiling. This, however, did not remove all opportunities. While the subjects fixated E a great deal, they did look at other things while E was in the room. During the period under discussion each baby began to watch her own hands and on many occasions performed this activity in E's presence. Not once was a smile seen while either subject was looking at her hands.

Aside from the patting of the chest, tickling of the ribs, etc., of Series I and II, no such stimuli were again applied until day 112. It must be concluded, therefore, that conditioning to tactual stimulation was not the cause of the development of social smiling. In opposition to this interpretation it might be urged that Series I and II themselves constituted the conditioning events. However, it has been pointed out that smiling as a response to tactual stimuli was quite undependable, and in that respect it is quite different from any unlearned response which has been subjected to laboratory condi-

tioning. Conclusive evidence, I think, against the view that social smiling resulted from the conditioning events of Series I and II is found in the fact that the effectiveness of the supposedly conditioned stimulus—the human face—continued to increase for several months after the close of these experiments. Such a phenomenon is unknown in the study of conditioning.

Satiation cannot be named as the unlearned stimulus since smiling as a result of nursing was very uncommon. With tactual stimulation and satiation apparently ruled out as possible unconditioned stimuli to smiling, I have gone over our notes and our tabulations many times in an attempt to find some original arouser of smiling to which the human face might have become conditioned. All such attempts have been unsuccessful. I must conclude, therefore, that social smiling is not a conditioned response in the sense it was supposed to be by Watson and others. Our records reveal no evidence of a dependable unlearned stimulus prior to the functioning of the human face as a consistent elicitor of the response. One cannot claim, therefore, that the adult's features derived their stimulating effect by association with another effective stimulus.

The most obvious alternative is the view that social smiling is instinctive. This view would hold that these infants would have smiled at the human face at the usual age in the absence of any previous experience with people. This view I am unable to accept. The unlearned dependence of smiling upon the human face and upon that alone implies a specificity in the sensory control of unlearned responses which has never been demonstrated in animals. In addition to this general objection to the view, there is one of a more factual nature. Recently I reviewed the literature concerning the behavior of children whose congenital cataracts have been removed by operation (3). These children, prior to the operation, had never seen clearly the human face. In accounts of their early visual reactions, there is nothing to suggest that they instinctively smiled at the human face, or even that they instinctively chose the human face for fixation. It can, of course, be urged that such observations are not decisive because the instinct has waned, or because some factor contrary to the expression of the instinct is present.

But a further piece of data concerning the instinct theory is provided by the present study. In the foregoing paragraphs I have been concerned wholly with the human *face* as a stimulus, because our



subjects smiled at the human face more frequently than to any other object. The observations of other workers (1) show however that children ordinarily smile at the human *voice* as commonly as to the sight of a person, and Bühler has proposed that the human voice is a native stimulus to smiling. It is noteworthy then that in the age period covered by this report we have *not a single instance of our voices arousing a smile from the twins*, although we spoke freely in the room (except when bending over the infants).

If the human stimuli to smiling are not unlearned, and if no other stimuli are native arousers of smiling the reader may well ask for an explanation of the development of the response. The theory which I wish to propose may sound paradoxical. It proposes that the stimuli which first elicit smiling are conditioned stimuli; there are no unconditioned stimuli to smiling. This view will become clearer when an example is presented. Upton (7) has found that when a sound is presented simultaneously with a shock on several occasions in the case of the guinea pig, the breathing response which follows sound alone is *a new response*. I propose that a comparable situation exists with smiling. While Pavlov supposes that all responses have unconditioned stimuli, this view does not seem to correspond to the facts and an acceptance of the alternative view does not seem to necessitate any other changes in the Pavlovian system.

The theory here proposed is that smiling is originally aroused by a stimulus (the conditioned stimulus) which has been associated in time with the cessation of unrest, fretting, and crying. In other words, smiling is said to be aroused by any stimulus which announces the release of the infant from distress.

While we know that smiling often occurs during the first ten days of life there have been no thorough studies of the sensory control of smiling at that time. Such observations as we have (2) lead us to believe that the newborn infant will smile only infrequently to any stimulus, and that tactual stimulation in the region of the lips and intraorganic stimuli associated with feeding are most effective. Our own data on early smiling are agreeable with this view. But as soon as infants begin consistently to fixate the adult, the adult becomes the most effective stimulus to smiling.

The lack of any fixed attachment between stimulus and response during the early months is attributed to the incompleteness of the



conditioning process. This incompleteness may be due to neural immaturity, or to lack of conditioning situations, or to both. The early rôle of tactual stimuli in the oral region is accounted for by supposing that objects which result in sucking frequently touch the face, and that sucking is soon followed by relief of hunger. The effectiveness of non-oral stimuli may be due to generalization of the partially formed conditioned response to tactual stimulation in the oral region, or to partially formed connections based on other relief from muscular discomfort. Since the chief forms of stimulation associated with sucking and with changes of limb positions in utero may be expected to be tactual and interoceptive, these stimuli should be more effective at birth than sight or sound, as seems to be the case.

Our appearance before the twins usually coincided, or nearly coincided, with the receipt by the subjects of relief of discomfort arising from being wet, from being soiled, or from being hungry. The infants were commonly fretting and crying as we entered the room and our appearance usually led to the cessation of fretting and crying. Roughly speaking, our appearance was associated with a decrease in unrest. The conditioned response, however, consisted not only of a cessation of fretting but of *smiling* as well. In summary, social smiling is a conditioned response based upon the relief of discomfort supplied by the adult. That is, a signal of relief, but not relief itself, calls forth smiling.

I had entertained for a while the theory that smiling might be caused by the reappearance of any familiar object. This view is negated, however, by the fact that the infants fixated their moving hands for several minutes at a time, yet never did we see them smile while thus observing their hands. They likewise did not smile when glancing at some familiar object in the room, nor upon hearing our voices.

If *any* signal of relief from distress will arouse smiling, it seems surprising that the nursing bottle did not acquire that power with our subjects. As a fact, it did not. This, perhaps, was because the bottle was not often in the baby's line of vision. The infant's fixation was more often upon the adult than upon the bottle. There is the further relevant fact that E bent over the crib to dry the babies as well as to feed them. E therefore more often provided relief than did the nursing bottle.

## SUMMARY

It has been customary to assume either that the human form and voice are instinctive stimuli to smiling in infants or that there is some instinctive stimulus, perhaps satiety or contact, to which the human presence becomes conditioned. Two infants were reared so that the adult's voice was not associated with the smiling aroused by other agencies. Under these conditions, the human voice never caused smiling. Smiling upon seeing the adult did nevertheless develop to a marked degree. In attempting to find the unlearned stimulus to smiling, it was found that from the beginning of the present study no stimulus was more effective than the presence of the adult. Hence it is difficult to name any other stimulus as more primary. It was found that social smiling most often occurred as the adult bent over the child to administer some attention but before the attention was delivered. These facts led to the formulation of the theory that smiling becomes a conditioned response to any stimulus which brings about a cessation of fretting, unrest, and crying. It has no unconditioned stimulus. The fact that smiling in the newborn does not follow *any* stimulus with much frequency is due to the incompleteness of conditioning. The smiles of the newborn to touches on the face or body and to satiation, which occur infrequently, are due to the fact that contact stimuli have been associated with relief from hunger and from cramped positions.

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## UN TEST EXPÉRIMENTAL DE DEUX THÉORIES DU SOURIRE SOCIAL CHEZ LES ENFANTS EN BAS ÂGE

(Résumé)

On a supposé habituellement que la forme et la voix humaines sont des stimuli instinctifs au sourire chez les enfants en bas âge ou qu'il y a quelque stimulus instinctif, peut-être la satiété ou le contact, auquel la présence humaine devient conditionnée. On a élevé deux enfants de sorte que la voix de l'adulte n'a pas été associée au sourire causé par d'autres agents. Dans ces conditions, la voix humaine n'a jamais causé de sourire. Le sourire à la vue de l'adulte s'est développé cependant à un haut degré. On a constaté qu'à partir du commencement de l'étude actuelle nul stimulus n'a été plus efficace que la présence de l'adulte. Aussi est-il difficile de nommer un autre stimulus comme plus primaire. On a constaté que le sourire social s'est montré le plus souvent comme l'adulte s'est penché vers l'enfant pour donner quelque soin mais avant que le soin soit donné. Ces faits ont fait la formulation de la théorie que le sourire devient une réponse conditionnelle à n'importe quel stimulus qui cause une cessation de l'irritation, de l'inquiétude et des pleurs. Il n'a pas de stimulus non conditionnel. Le fait que le sourire chez le nouveau-né suit pas *n'importe quel* stimulus avec beaucoup de fréquence est dû à l'état incomplet du conditionnement.

DENNIS

## EINE EXPERIMENTELLE PRÜFUNG VON ZWEI THEORIEN DES SOZIALEN LÄCHELNS BEI JUNGEN KINDERN

(Referat)

Es wird allgemein angenommen, dass die menschliche Gestalt und Stimme entweder instinktive Reize zum Lächeln bei jungen Kindern seien, oder dass es irgendeinen instinktiven Reiz gebe, vielleicht Sättigung oder Berührung, zu welchem die menschliche Gegenwart bedingt werde. Zwei junge Kinder, wurden so erzogen, dass die erwachsene Stimme nicht mit dem durch andere Quellen verursachten Lächeln assoziiert wurde. Unter diesen Umständen verursachte die menschliche Stimme nie das Lächeln. Das Lächeln bei der Ansicht des Erwachsenen entwickelt sich doch zu einem bemerkbaren Grade. Es stellte sich heraus, dass vom Anfang des vorliegenden Studiums kein Reiz wirksamer war als die Gegenwart des Erwachsenen. Folglich ist es schwierig, irgendeinen anderen Reiz als ursprünglicher zu nennen. Es fand sich, dass das soziale Lächeln am häufigsten vorkam, wenn der Erwachsene sich über das Kind beugte, um ihm

irgendeine Aufmerksamkeit zu erweisen, aber bevor die Aufmerksamkeit erwiesen wurde. Diese Tatsachen führen zur Formulierung der Theorie, dass das Lächeln eine bedingte Antwort auf irgendeinen Reiz wird, der ein Aufhören des Verdrusses, der Unruhe und des Weinens veranlässt. Es gibt keinen unbedingten Reiz. Die Tatsache, dass das Lächeln beim Neugeborenen nicht auf irgendeinen Reiz mit Häufigkeit folgt, ist die Folge der Unvollkommenheit des Bedingens.

DENNIS

# THE PSYCHOLOGICAL CONSEQUENCES OF UNEMPLOYMENT\*<sup>1</sup>

*From the University of Warsaw and the University of Vienna*

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BOHAN ZAWADZKI AND PAUL LAZARSFELD

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## I. INTRODUCTION

1. *Problem.* Unemployment, long discussed in detail and described as an economic, as a sociological, and as a political problem, now becomes also a problem for the psychologist. Several investigations (see references) have described on the one hand the unemployed group, and on the other hand the unemployed individual in his changed reactions. But there is still much to be said about the nature of the experience of the unemployed, and that is what the psychologist is most interested in. The phenomenological presentation of the mental history of the unemployed, of the way in which he experiences his own lot, the way in which the unemployed subject reflects outside conditions and events, is a most stimulating psychological problem.

Certain material has recently been made available which might throw much light on this subject, namely, some autobiographies of unemployed people. The Institute for Social Economy in Warsaw (Director, Professor L. Krzywicki) held a contest for autobiographies of the unemployed.

The contributors were given the following instructions: the reports should include name and address; certification from the Board of Labor; personal data about self and family; data about the doles which were paid to them or members of their families; former occupation or profession; the length of employment; when and why they lost the job; former earnings.

The following questions were to be answered as fully as possible:

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<sup>1</sup>We wish to thank Mrs. Aniela Zadwadzka for spending much time on the biographies; Dr. Maria Jahoda-Lazarsfeld for enriching our material through her insight in this field and for help in preparation of the manuscript; Professor Gardner Murphy for reading and criticizing the manuscript; and Miss Alberta Curtis for careful translation.



diet of the family; influence of unemployment on the health of the family; pawning and selling of household goods; debts and occasional earnings. In addition the contributors were to describe their lives thoroughly and precisely. The best biographies should be awarded: first prize, 250 Zl., second prize 100 Zl., and 10 prizes of 25 Zl.<sup>2</sup> Besides these prizes, the authors of such biographies as should be printed would receive an honorarium of 5 Zl. per printed page.

During one month the Institute received 774 biographies, which represent 2.5 per thousand of the unemployed registered in Poland at that time.

Of the 774 biographies received, the Institute has published thus far only 57. A main criterion for the selection was the ability of the writer to express himself; colorless reports were excluded; also, all papers were excluded of which the insincerity was obvious—if, for instance, one saw that they were written only to arouse pity, or in a servile way to try to get a job through the Institute. Moreover biographies of those whose unemployment had lasted more than ten years were thrown out, as were those of people who had not been workingmen, such as bankrupt grocers, etc.

The selected 57 biographies were published in full at the beginning of 1933 under the title "Memoirs of the Unemployed," with an introduction by Professor Krzywicki (7). Our further considerations refer only to these 57 biographies.

Before we proceed to a more detailed description of the 57 biographies and their psychological evaluation, we shall characterize the specific merits and defects of this material.

The first criticism of the use of autobiographies is of course the question of their reliability. Is it possible to distinguish between truth and fiction? This is a question with which Prof. Krzywicki deals in his introduction. He, knowing the whole material, states that those biographies which were written to arouse the pity of the readers and to present everything in the darkest colors were very rare and easily recognized. He said that the danger of saying too much was no greater than that of telling too little out of shame; but that thefts, punishments, begging, etc., were freely admitted, so often that the material probably did not suffer too much by devia-

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<sup>2</sup>One Zloty was equal in 1931 to about \$.11.

tion from reality through concealment. Finally there was, in nearly all published cases, investigation of the homes of those concerned by representatives of the Institute, so that authentication of the facts was possible.

In the nature of the case, the investigator could not make a psychological study of all the responses of the unemployed, so that authentication is not complete. We fully admit that the data which follow are based upon narratives which we suppose to be true but cannot *prove* to be true. The data are offered because they offer hypotheses which are of value in the study of our problem; such hypotheses are necessary in research even when a technique for testing all factual details is still unavailable.

But if we can suppose that the material is reliable, we must still consider another question: is the material also representative? Does it include anything which holds true for more than these 57 cases? For the representative character of the material it is argued by Professor Krzywicki that the biographies agree in many most important details. The argument against its representativeness is the fact that the contributors are a certain selection of the mass of the unemployed. In order to know about the contest, one had to be a newspaper reader; one had to be willing and able to express oneself in writing; and, in spite of need, one had to be willing to spend money on writing materials. From all these facts, Professor Krzywicki concludes rightly that the material is reasonably representative, a claim which is confirmed by the many repetitions which it contains; representative of course not of the totality of the unemployed, but of the "higher" strata ("higher" indicating a certain grade of cultural development and a certain activity). If, however, the 57 contributors do not belong to all the strata or are not distributed among them in the same ratio, i.e., even though they are not statistically representative, we may assume nevertheless that they are phenomenologically representative; that their utterances give a vivid picture of the experiences of those who are less able to express themselves. We must admit the assumption that among the contributors there are only a very few representatives of the most active unemployed, namely, those who are under the influence of the most radical political parties. One knows from everyday experience that these workers usually boycott activities which are arranged by a non-partisan institution such as the Institute for Social Economy in Warsaw.

No special remark is necessary upon the psychologist's right to comment on material gathered and published by other agents for a non-psychological purpose. The analysis of such material, by pointing out under which psychological categories it can be treated and how it can be interpreted in the light of other findings, is one of the outstanding contributions psychology can make to social research. This method is as different from case studies as it is from statistics, and to demonstrate its scientific worth has been one of the aims in undertaking this report.

2. *Personal Data of the Contributors.* Of the 51 men and 6 women whose papers were published, 38 lived in cities and industrial areas of over 100,000 population, 15 in small cities, and 4 in villages. According to age, they are distributed as follows:

Age	Men	Women
under 21	3	2
21-30	22	3
31-40	18	—
41-50	6	1
over 50	2	—

According to their occupation the men include: 33 skilled laborers, 9 unskilled laborers, 5 tradesmen, 4 clerks; the women, 3 workers and 3 of professional class.

The 51 male unemployed<sup>3</sup> have to support the following number of people:

only themselves	9
1-3 persons	24
4-6 persons	17
more than 6	1

The number of persons whom the contributors had to support is not exceedingly large; in respect to the number of family members they are average families. In addition to the immediate family (wife and children) there are also occasionally father, mother, and siblings, who however are intermittently supported and supporting. In 24 of the 51 cases there are young children:

1 child in 4 families
2 children in 7 families
3 children in 8 families
4 children in 2 families
5 children in 3 families

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<sup>3</sup>The women are mostly single.

More or less exact data regarding the length of unemployment we have in only 50 cases, which are distributed as follows:

less than 1 year	14 cases
1-2 years	15 cases
2-3 years	14 cases
3-4 years	5 cases
more than 4 years	2 cases

This shows that they are not professional loafers, but are really victims of the present crisis.

## II. THE WAY OF LIVING OF THE UNEMPLOYED

1. *Sources of Income.* Since the state unemployment doles in Poland are paid for only 13 weeks (earlier, 17 weeks), those out of work have to look for other help in order to live. The most desirable solution of the momentary situation would of course be a new job. In only the rarest cases is the search for work successful, even for a short time. The state unemployment dole plays a part temporarily, and the help from community boards is given very seldom and mostly in the form of occasional gifts of coal and potatoes, so that the importance of private charitable institutions and personal help becomes ever greater. But these sources of aid turn out to be ineffective. In five cases it was reported that the help of relatives was given. In some cases former fellow-laborers helped; collections were taken up, etc. The significance of all this lies not in the material help—it is too small for that—but in the sense of solidarity conveyed.

Much more important as material help are the "occasional" jobs. Work on construction and restoration is reported most often, but selling from house to house and in the streets is also important. The women do washing, make toys and baskets, and sew neckties. The men sell these products in the streets. Occasionally they can distribute advertising leaflets or gather and sell berries and mushrooms and thus earn a trifle. Some try to learn a new trade and follow it on their own account.

The selling of household goods and clothes which is generally reported is mentioned as a matter of special mental stress, because it is striking evidence of social decline if household equipment which was built up for many years goes to the pawn shop or second-hand dealer. There is a quite characteristic sequence in which the

owners sell their goods: usually one begins with books, if there were any; then follow the mirror, the sofa, the wardrobe, finally wedding rings. Twice top-coat and suit were sold before the victrola. Sometimes even the mattresses are sold, and then the whole family must sleep on the floor. One related how he heated with his furniture during a hard winter. This loss of household goods was reported in 25 cases.

If the state or community support, together with private help, occasional earnings, and selling of household goods are not sufficient to maintain life, sometimes other sources of income are tried: singing in courts and collecting bread and garbage are only masked forms of begging. On the other hand, the "collecting" of vegetables on others' premises, of coal in coal yards, of rabbits in the woods, etc., is legally designated as theft, although it is not always experienced as such. But begging and stealing which are subjectively felt as such are also admitted by the writers (8 writers in the case of begging, 7 in the case of stealing), and it is mentioned as a frequent phenomenon among others not employed; prostitution is only occasionally mentioned. (About the attitudes of the contributors toward those sources of income which arouse mental conflicts, see Section III.)

Having presented the sources of income of the unemployed, we put the question of how one can live by such means.

2. *Standard of Living.* All interests, all energies of the unemployed are concentrated upon the getting of food. Thirty-two cases report more or less prolonged hunger. In order to give an impression of the way the unemployed live, we quote a passage from a diary which is especially reliable because it was written before the contest of the Institute was held.

November 8, 1931. Yesterday I earned 1.46 Zl. by selling picture frames. For breakfast we had tea and bread. My wife bought a half liter of milk for the children for dinner, and there was potato soup; for supper the rest of the soup from dinner. I sawed frames the whole day.

November 9, 1931. My wife made flour soup for breakfast. I went away in the morning to sell the frames, which I had sawed on Sunday, and did not come back until evening. I sold two pieces and earned 80 groschen. At night I ate soup left from dinner, cabbage soup with potatoes.



November 12, 1931. For breakfast potato soup. It has become loathsome, but when there is nothing else, one has to eat it. My wife is about to finish her work; she has to deliver it tomorrow, but probably she will not be able to do so. Today I earned 1.50 Zl., but I had to pay the policeman a fine of 2 Zl.<sup>4</sup> I wish that he had never been born! He took my whole earning and I even had to add to them. At night I ate potato noodles with crackling.

This kind of report is especially reliable if it does not refer to the writer himself. That is why we shall quote further an account which a contributor gives about a family of his acquaintance who live in the same industrial town. The family consists of the parents and two young children. The father makes straw mats and peddles them.

They live squalidly, miserably, so miserably that it is difficult to imagine it. They have breakfast between eleven and twelve, and it consists of a small tureen of soup of rye flour with oil or tallow and a couple of potatoes. They eat bread once or at the most twice a week. They have dinner between four and five, which is again a small bowl of soup and potatoes. They have lived this way weeks, months, indeed almost a year. There are no Sunday or holiday feasts, and there cannot be any since they always have the same dishes.

That one has not had even a piece of bread to eat all day long is mentioned as an ordinary fact. Besides the continual undernourishment there are related also *acute* hunger experiences.

This writer, a 28-year-old joiner, single, decides to die, since he has no more strength to beg:

I lay on my pallet. One day and one night passed somehow. But on the next I had a fever and pains. The pains soon passed away, in the afternoon I was feverish again and began to be delirious. It seemed to me that I was falling into a deep hole; then, that my head swelled very fast. I felt that it was already very large. I saw one eye, then two, three, until thousands of eyes looked at me. I could not get up because I was too weak. I was conscious the whole time, but ever weaker. At night I had nightmares and could not sleep any more; and I saw display windows with bread and other food.

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<sup>4</sup>For peddling without license.

Two days and two nights passed this way, but death did not come. I could not pray any more, because my brain began to work weakly on the third day. I drank water very often, which later came out of me without my noticing it, so that the pallet was very wet. I fainted, and when I came to myself again it was already the fourth morning of my fast. With the greatest effort I found myself a little water, which stood by my pallet. I moved my lips incessantly to keep them wet, because they became parched. Before evening the fever and pains attacked me. At night they disappeared, but my eyes ached very badly, since I held them open all the time. My heart beat feebly.

The next morning the writer was found and rescued by his brother. And here another example:

Strange! When there is nothing in my stomach but emptiness, when red and yellow spots dance before my eyes, and my legs buckle under, then I feel a queer uncontrollable greed for chocolate. My parched tongue feels its taste and my whole body simply cries aloud: Chocolate! Chocolate! Already several times I have been seized by the idea of throwing my whole body into a show window, fasten my teeth into an ingenious pyramid of chocolate, and gobble, gobble in great pieces and swallow them. . . . Afterwards they could even hang me.

This kind of more or less detailed account of hunger experiences with pains, faintness, spitting of blood, etc., we find in ten of the 57 biographies. Especially the theme of the exciting effect of show windows in food stores and overcrowded cafés is recurrent. As objective consequences of starvation are mentioned: the miserable appearance of family members, especially the children; the diseases and the loss of strength which makes it impossible to carry on any happily-found job, such as shoveling snow.

Next to hunger, cold is one of the greatest evils which plague the unemployed. One writes:

It is mercilessly cold. My suit is ragged, miserable, my shoes are full of holes, the soles thin. I have nothing to wear outside to look for work or bread, since the moment I am outside, the frost grips my whole body. In the room it is cold, too, because we have no fuel. The walls are wet, so that the water runs down. The cracks in the windows are stopped with

rag. If one of the children has something to put on, it does so; they bind their feet with rags and sit all day in bed. If it is very cold, the four children sleep one on another in the same bed with us.

The suffering from cold is mentioned 22 times. The quoted account may be taken to describe all, since they all sound the same.

Homelessness in the strict sense of the word is mentioned relatively seldom, but it is difficult to distinguish it from "voluntary" vagabondage (that is, wandering in search of work, which is reported 17 times.) Homelessness as such is mentioned in only two cases, once of a family which was forced to spend 48 hours outdoors in winter after eviction until they found shelter in a stable; again of an unemployed man who lived for some days in a staircase. Living in a barracks for the homeless is mentioned in two cases. But the fear of expulsion is reported 15 times.

After having described the conditions of existence of the unemployed, we ask how they spend their time under these conditions.

3. *Use of Time.* First of all, they look for work. This search seems to take a typical course, as follows: almost all contributors report that immediately after losing their jobs they start an energetic hunt for a new position, but as time goes on this becomes less active. As a rule they look for something first in their own vocations. Only when they are convinced of the hopelessness of these endeavors does this tendency disappear and give way to a search for any kind of steady position. An employment office is mentioned six times, and always as absolutely worthless. Personal applications for work are mentioned much more frequently than those by writing. At the very first one visits again and again his last place of employment; finally he looks for a job in every factory or shop, sometimes even in every private house. The majority remain in their own home town, but 17 tell about trips as tramps and wandering on foot.

A peculiar change takes place in the world of values of the unemployed in regard to work. One has the impression that the writers cannot find words sufficiently enthusiastic to describe the value and dignity of work.

A 28-year-old metal worker complains that "Fate has not granted it to me to enjoy the pleasure and happiness that work gives."

Another: "I was devoted to my vocation, that of printing. I was

happy that I could contribute to the spread of education through my work. That is why I suffer so much from enforced idleness."

A 20-year-old unskilled laborer says: "Whoever complains on account of hard work does not deserve to live. He commits an awful sacrilege. He does it without knowing, because he has not experienced the numbness of an idle life."

Such statements about the value of work we find in thirty biographies, but the wish to find work and the longing to be occupied are the leading notes of all the biographies. Some writers give the impression of being obsessed by the thought of work. These thoughts seem to have the character of an *idée fixe*.

This first energetic search described means that the unemployed are at first only earningless, not jobless in the strict sense, because they busy themselves in their quest. One of them begins his biography with the words:

"The search for work is the worst and hardest kind of work, tiresome and unpaid."

In the whole 57 biographies complaint is made only seven times about an excess of time. The others seem to have no reason for it, because they really look continually for work or get extra-vocational jobs. It is notable that of the entertainments which might be used to fill up time, such as card-playing, sports, listening to the radio, only one is mentioned, and only once, namely skiing. The reading of newspapers (in which they looked for the help-wanted ads) is mentioned in six cases; reading of books also only six times. One complains that he cannot afford a subscription to a circulating library any longer. "Books, movies, and a radio became a luxury," write two others. In spite of the lack of entertainment, most do not complain of boredom, they are concentrating so diligently on finding work.

This conclusion contradicts the popular opinion about the idleness of the unemployed. However, we find accounts of one way of spending time among the unemployed which has become well known, namely, staying in bed. But it turns out that seven of our contributors are forced to excessive sleeping, for instance, from four o'clock in winter until noon. By staying in bed they can save light and heat, and can bear it to eat only once a day. On the other hand, only two cases report that they stayed in bed all day because they had nothing better to do. One of these says:

The days stretch themselves out infernally long and tediously. A day, as I spend it, passes without hope. I sit in a chair and look blankly at a clock, the ticking of which reminds me of rain dropping. Its hands move slowly, one minute after another. And I sit always dle. I long for a colorful life, for movement and action. But I cannot force myself to it. How can I force myself when all was dead in me long ago? And to await death means to be a corpse already.<sup>5</sup>

This example leads to the question of the specific moods and emotional attitudes which result from the way of living of the unemployed.

### III. EMOTIONAL ATTITUDES AND SPECIFIC MOODS OF THE UNEMPLOYED

The particular value of our autobiographies lies in the fact that they contain a wealth of description of moods which, as they are at first hand, are more suitable than any other data for answering the question, "How do the unemployed experience the situation?"

First we ask: how do the basic emotional attitudes change during unemployment? Are there here any typical sequences of certain moods? How are these related to the length of unemployment? What factors are decisive for the change of mood?

In regard to the temporal sequence of different moods, we have to distinguish two types of sequence: those in whom loss of work immediately produced a strong affective reaction, and those who did not have much affective response. The manner in which the loss of work is recognized is very characteristic of the individual during the first part of his history during unemployment. But the further course of life of both types is very similar, because those who at the first moment reacted very strongly sooner or later become quiet, and in the later phases behave in the same way as those who have kept quiet from the beginning. On the other hand, all the unemployed, those who have regained mental balance as well as those who never lost it in the beginning, finally reach a stage of extreme distress.

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<sup>5</sup>The same writer reports that when he is exhausted with heart trouble he lies in bed all day long. He experiences strong sexual excitement which ends in masturbation. This confession, and another one just contrary—that hunger quiets sexual instincts—are the only two in our material about the sexual life of the unemployed.



One can present quite schematically as follows the typical course of moods of the unemployed: (1) As a reaction to dismissal, there comes generally a feeling of injury; sometimes strong fear and distress; sometimes an impulse toward revenge; hatred; indignation; fury. (2) Thereafter comes a stage of numbness and apathy which is gradually (3) replaced by calming down and an increase in steadiness, bringing one again to a relative mental balance. This mental stage is characterized by a resumption of activity; the unemployed become calm as they see that things go along somehow, and adapt themselves to circumstances; they trust in God, fate, or in their own ability, and try to believe that the situation will improve very soon. (4) But this hope becomes constantly weaker, when they see the futility of effort. (5) When the situation becomes harder, the old savings and new sources exhausted, then comes the hopelessness which expresses itself at first in attacks of fear, for instance, fear of winter and of homelessness, which culminate in distress, the expression of which is the thought of and attempt at suicide. (6) After these outbreaks usually comes either sober acquiescence or dumb apathy, and then the alternation between hope and hopelessness, activity and passivity, according to the momentary changes in the material situation.

1. *Types of Basic Attitudes.* Although individual deviations from the above schematic outline are numerous, since the moods change in the same individual in different periods and on different occasions, it is still possible to distinguish certain general classes or types of basic attitudes. These basic attitudes characterize not merely a mood of an individual at a given time; they characterize his behavior through the whole of a long period of unemployment. The basic attitudes are conceived as habitual characteristics of different personalities; they are the dispositional background on which the above outlined development of mood occurs, with necessary differences in duration and intensity of the separate phases in each individual.

From our biographies it appears that the basic attitudes stated in the monograph, *Die Arbeitslosen von Marienthal* (4) namely: the *unbroken*, the *resigned*, the *distressed*, and the *apathetic*, can be seen clearly in our material, a fact indicating that these basic conceptions are sound.

We select from our material examples which illustrate the subjective side of each of these basic attitudes with some distinctness.

The contributor of this was a thirty-year old elevator man in a coal mine, married, with two young children, unemployed for a year and a half. Immediately after dismissal he had a feeling of absolute perplexity. Afterward he begins to look for a job, and the family to starve. After the dole is exhausted, he again feels perplexed. During a demonstration of the unemployed he is struck on the head with a stone. Strangers help him. Later he finds occasional occupation. When he gets books to bind, he feels that he is saved. Later he carries on different jobs: gardening; work as a carpenter's helper; work as a harvester. The family starves no longer. He concludes his biography with the following words, "I wonder how I could have been so perplexed at the beginning of joblessness. Today, after a year and a half of unemployment I feel satisfied. . . . And yet, when we sit around in the evening and talk things over, we always dream about the time when I can get steady work again, in order that 'better times' can come."

This is the best example of the *unbroken*. He confesses to being satisfied, is active and enterprising, but it is true that he had good luck in getting jobs which prevented starvation.

A twenty-nine-year-old factory worker, single, unemployed for three years, wanders about, sometimes finds a job at seasonal occupations. During an outbreak of distress he blasphemes in spite of his piety, and gets ideas about suicide. After severe grippe he is dismissed from the hospital; he lives in a kitchen with an acquaintance, and gets dinners from a charity soup kitchen; he earns nothing. The closing words of his biography are: "Full of pain and bitterness, I am waiting, without knowing what for. So many disappointments in my life do not discourage me even now from awaiting a better future. But my situation does not permit any great expectations."

In this case we see very distinctly the same subjective traits which the authors of *Die Arbeitslosen von Marienthal* stated for the *resigned* attitude: extreme limitation of all needs; no plans; no definite relation to the future; either no hopes at all or hopes which are not taken seriously; but the feeling of relative well-being is lacking in this case.

As an example of the *apathetic attitude* the following can be used:

A carpenter, about thirty years old, married, unemployed for some months, but not longer than thirteen weeks, because he still gets the dole, described the morning after dismissal with the words: "Grief, tears, impulses to revenge, numbness. For a time, awakening in the morning is unbearable. The world becomes ever gloomier and viler. One sees in it neither pity nor friendship." He looks for work at a labor exchange; there he gets a sarcastic answer which angers him. After one day of fruitless search for work he says, "I decided not to go anywhere any more. And for two months, lying in the sunshine, I wait quietly for the day when my wife will tell me that she has spent the last money and that the grocer does not want to give us credit. . . . But it lasts very long, and I ask myself how fate will finally decide." He stays inactive, although previously painting was a hobby which he practiced devotedly.

So we see him as he apathetically lets things go without an attempt to save anything from ruin. Idle contemplation; mood not distressed but indolent; no plan; carelessness—not out of self-confidence but out of unconcern—all these criteria of the *apathetic attitude* we see realized in this case.

And now an example of the *distressed attitude*:

A forty-one-year-old locomotive engineer, married, five children, ranging in age from four to fifteen years, out of work for a year, during which he worked three months in his own vocation, tells also of working sometimes as a barber; the children gather mushrooms; he changes his residence in search of work. The change of mood he characterizes, "Awful time, when one waits from day to day for a job. The misery of fruitless waiting: Fear of the future!" When he did not get part of his dole: "I seethed with rage and desire for vengeance. I did not know against whom, but did know it would be horrible." When the unemployment continues: "Gloomy thoughts tried to burst my brain." Full of hatred, he leaves the city where he has lived for a long time. He would like to hope, but he has no hope whatever. He concludes as follows: "I never drank liquor, but if I could have it today, how glad I would be to sink into unconsciousness and leave behind me misery, suffering, and the ironies of life."

Hopelessness, bitterness, hatred, outbreaks of rage, gloominess as an all-pervading feeling, flight into drunkenness, or, much oftener, thoughts of suicide—these are the main traits of the attitude of distress.

Although distress as a basic attitude marks only one group of all our biographies, it appears as a momentary mood in almost every one of the 57. To be sure, the fullness and vividness of description vary greatly; sometimes it is given only cursory mention.

How do the unemployed reach this stage of distress? Usually it is preceded by ever-increasing perplexity and hopelessness, fear of the future, often also acute hunger-experiences. Fear seems to be taken into account far too little when considering the experiences of the unemployed. However, it seems that fear of the cruel tomorrow, the feeling of being hunted to earth, of being hemmed in, and absolute helplessness, are very typical. Experiences of fear are mentioned in 13 of the 57 biographies.

Typical example:

"No childhood specter, no nightmare, was as terrible as the appearance of the brutal landlord" (who wanted the rent).

2. *Feelings of Degradation and "Superfluosity."* The particular state of mind of the unemployed which culminates in outbreaks of distress is not to be understood as produced only by the many physical sufferings or fears of the future; joined to this are many other sufferings which result from changed social status. Through many subsequent degradations these people lose their sense of human dignity and suffer intensely.

I look for a job. I bow with servility, I ask, I beg, I humble myself and lose my ego. I become a beast, a humiliated beast, excluded from the realm of society.

Another:

Life has made a coward of me. Sometimes I would like to bend myself in an humble way before the world and beg, "Buy me! Buy me!" And then I burn for shame.

Of what are the unemployed ashamed? In only four cases are they ashamed of their own inability and ascribe the cause of their trouble to themselves. Most of them are ashamed, rather, of their misery.

One of our contributors, who was in charge of a social agency, made an investigation among the unemployed, and has to report that if they have to confess that they have no coats or shoes they say it as if they were ashamed of it.

Another writes:

I am strangely bowed down. It is hunger which bends and humiliates people this way. I pull myself up, chest out, belly in. Nobody shall know that I am hungry. At least appearances should be saved.

A 43-year-old mason writes:

How hard and humiliating it is to bear the name of an unemployed man. When I go out, I cast down my eyes because I feel myself wholly inferior. When I go along the street, it seems to me that I can't be compared with an average citizen, that everybody is pointing at me with his finger. I instinctively avoid meeting anyone. Former acquaintances and friends of better times are no longer so cordial. They greet me indifferently, when we meet. They no longer offer me a cigarette and their eyes seem to say, "You are not worth it, you don't work."

Very many of the unemployed feel themselves abased by the necessity of being supported, and the doles are regarded as alms. Let them speak for themselves:

If the unemployed would do anything, even very little, to earn the dole, the whole thing would be different. Such a man would know that he gets his money for accomplishment of a duty, for some achievement. He would stop being a beggar.

Another says,

How unwillingly I went to the unemployment insurance office. I almost went down before this stroke of fate. As a matter of fact, I shall get only that money for which I am insured. Is it my fault that I—although I am so young—am doomed to enforced idleness? Many who come here are ashamed and try not to be noticed by anybody. It is nothing to boast about.

The ambivalent attitude toward the dole is in this last case especially clear. In spite of the rational insight that he only exercises his right, the emotional reaction is a feeling of humiliation.

The experience of degradation plays a part also in the change



in the mutual relations between husband and wife. In 21 reported cases, the marital life of 11 remains unhurt; in fact, the common misery brings the couples closer together. In ten cases, however, appear the reproaches which the wives bring against their husbands: that they are to blame for this misery, being so indolent that they cannot earn anything. These charges, although unjust, are very painful, and their only result is to increase sensitiveness and bitterness, and to create ever-deepening estrangement.

The same holds true for the relation between parents and grown children. As a rule, there is a mutual bitterness and estrangement if the adult children, instead of supporting the parents, are partly or even fully supported by them. The table shows this:

	Good relations	Bad relations
Grown children who support their parents	6	0
Grown children, who are supported by their parents	1	6

In spite of the theme of degradation which appears so often, it is not the injury to social pride, nor the feeling of sinking in the social hierarchy, but a more general and deep-rooted motif that is mentioned most often and most bitterly: it is the feeling of being superfluous, and, bound up with it, the feeling of aimlessness, of mere vegetation.

One youth writes:

I become something absolutely superfluous in my own family. I am 19 years old, and I define my part quite clearly as that of a sponger.

Another:

We people without work are pariahs; never satisfied, always hungry, ragged, fearful, perplexed, begging for work. We are weaponless, thrown out of factory gates, like homeless dogs, like disinherited sons, superfluous.

The same later:

I want to be useful. Today I am an idle parasite.

Another one:

Of the many unemployed who have committed suicide lately, many did it, as I believe, under the influence of the fixed idea

that they had become superfluous in the world. Really, every unemployed person is excluded from the creative life. For instance I had, as long as I worked, although I did it for the wages, the definite feeling that I participated in the antlike, productive activity of mankind.

The catchword "superfluosness" appears in different contexts in 12 of the 57 biographies.

3. *Increased Sensitivity.* It seems that this feeling of superfluosness leads to an oversensitiveness toward the stimuli of the external world, and to general irritability so characteristic of people who are under a long strain. Take as illustration the following report of a planned suicide:

The decision to suicide was stimulated by the fact that a beggar, who had come to ask alms, offered a little food of his own when he saw the misery in the flat. The man, who decided to kill himself under the influence of this humiliation, deliberated for hours, and he is no impulsive youth, but the father of a family, a 56-year-old weaver.

Similar reports about suicide appear 27 times, that is to say in half the biographies. Although we have no statistics comparing this with employed people, we can be sure that this is a high proportion. In six of the 27 cases the murder of the family was planned too. Details about the first steps toward execution of this plan are reported in all six cases; two really tried but failed. The attitude toward suicide shows a certain inertia which will be discussed later as a very characteristic feature of the whole attitude of the unemployed. Witness the following typical report:

A 22-year-old clerk, single, unemployed for more than a year, homeless, roving about at night in the streets, because he is driven out of the railroad station, comes to a bridge, and watches quietly and without interfering while a poor ragged tramp jumps into the river. When the policeman made him responsible, since he did not prevent the suicide, our writer explained to him that he has not the least right to keep an unfortunate man in this miserable life. After this scene he was in such a mood himself that he could hardly keep from jumping into the water.

Sometimes the deliberations about suicide recall the attitude of adolescents in times of stress; these deliberations give the impression

of being threats, against God, fate, society or what not—they themselves do not know against what.

In order to corroborate our thesis that there is an increased sensitivity in many of the unemployed (which in some cases approaches a neurosis) we must also refer to another field, namely, that of family relations. The analysis of many cases allows us to state that the unemployed have in their particular situation an ambivalent attitude toward their young children. On the one hand, they feel them to be a burden which weighs especially hard when the fruitlessness of endeavors to earn a living becomes obvious. On the other hand, the love of the children and the feeling of parental duty works as an incentive to renewed efforts. In general, the relations of the unemployed to their children differ from those of the employed not in quality but through the increased intensity of opposed and alternating emotional components.

4. *Inert Aggressiveness.* This increased sensitivity expresses itself also in the *manifestation of hatred and impulses to revenge*. As the thought of suicide is a negative, retreating manifestation of despair, these aggressive impulses are apparently more positive, self-assertive manifestations of the same mental state; but here again we find an element of inertia. The impulses to revenge which are felt during outbursts of rage are stimulated either by concrete events (for instance, threat of expulsion, delay in payment of the dole, refusal of alms, etc.) or without any definite occasion. Here is an example:

A laborer in oil wells, about 20 years old, passes through a strange city in the early morning in search of work. He envies the rich who are sleeping quietly in their beds during these deliberations: "It seemed to me that I absolutely had to beat a doorman who stretched himself before a hotel, or that I had to lay a pole on the trolley track. . . ." The same, in another passage, "Yesterday I saw a foreman shoving a workman around. I gave him a heavy blow. . . . I need a few bullets. I would get a hellish satisfaction if I could see fear in the eyes of that slick rascal. Yes, that would be best. A devil drives me to it. Just wait, scoundrels!" When finally the author found a job in a factory he was immediately dismissed because he participated in a strike. The dismissal was a shock to him; he blamed the factory director for it. He decided to kill the director

with a heavy key. He recovered his senses only in the last moment before the blow.

The impulses to revenge are sometimes not only without definite occasion but also without definite object. One writes thus:

. . . I boiled with rage, need for revenge. I did not know against whom I wanted to take this revenge, but I did know that it would be a terrible one.

They are blind, undirected, outbursts of a general bitterness, increasing month after month.

The only one of all the contributors who put down his biography in a tone of keen irony reports that he hunts in the woods for young crows and hawks to make soup of them. He confesses that he makes a practice of tormenting the young birds.

Once I asked my fellow hunter "Why do we torment these birds?" He answered, "There is a rule that a man to whom wrong is done does wrong to others and enjoys it." After a moment he added, "Perhaps we are training ourselves in doing justice."

The sentence, "I hate everything and everybody" is repeated in a symptomatic way in different formulation in 10 biographies. Equally frequent are expressions of indignation and threats for the future.

But only in single cases have these threats the character of a definite political attitude.

One, who describes himself as a class-conscious proletarian, writes:

When I went down the boulevard sometimes, I used to be very irritated. Because, please imagine, I walked there hungry and staggering, but the aristocratic gentlemen were all riding horseback; I was homeless, but here were splendid palaces and villas where only a few people lived. Often I thought to myself, "Ah, if one could place a few machine guns on the corner and shoot all these parasites, all this high-born rabble, and remove them from the earth!" I was enraged yet powerless.

And when the same one stands before the window of a luxurious restaurant he dreams:

Sooner or later this pack of fat dogs will be exterminated.

One day the hungry mob will throw itself on them and tear them to pieces. I, an unemployed man, say it to you.

This kind of expression, which discloses a ready or ripening revolutionary attitude, we find in our material in 5 cases. The remaining affective outbreaks are either emotions of hatred which are directed against definite persons on definite occasions, or are expressions of a general irritability directed against no object—or rather of resentment against the whole world, as is shown in the following quotation:

I fall into such a rage that I cannot stand any people around me.

5. *The Shift in Class Consciousness.* The piling-up of this kind of experiences makes comprehensible the way in which the originally objectless impulses of hatred and envy of the unemployed finally find an object, sometimes even in a quite unexpected form: they direct themselves against the employed. This particular shift in class consciousness is expressed in a typical way in the following:

Nowadays the real social difference is not the traditional class difference but the difference between the two main groups of mankind: those who enjoy the boon of employment, and those who are denied it.

This more theoretical statement is illustrated by the utterance of another unemployed man:

. . . And yet, if I hear that one of my acquaintances was dismissed, I am not sorry for him. I suffer hunger and misery, let him suffer it too; let all suffer the same need I experience; perhaps they will finally understand what real hunger means.

Another:

How tedious life becomes without work. When I meet my fellows who work I just feel envy.

The disintegration of the feeling of solidarity among the employed who are in fear of dismissal is described by a locksmith in a large textile mill:

They gave notice of impending dismissals. The workers are sad, resigned, and gloomy; they look at each other with hostility. Who will be first? The worst is the uncertainty. . . .



We suspect each other of spying and obsequiousness. Whisperings, guessing, bowing and scraping to the foremen to the loss of one's own dignity. All this for work, for a piece of bread. Down with fellowship and friendship. I am better than you. Humiliating, feigned, flattering smiling . . . Handshaking, and in the heart the poison of hatred. In the mind, the thought, damn, let them fire me.

The significance of the above quotations is hardly to be overestimated. They disclose a basic fact which seems not to have been remarked before this. This fact of the disassociation of feelings of solidarity among the proletarians, the shift in class consciousness, the split in the masses, *explains the weakness of the unemployed as a mass: the masses cease to exist as such when the social bond—the consciousness of belonging together—does not bind any longer.* There remain only scattered, loose, perplexed, and hopeless individuals. *The unemployed are a mass only numerically, not socially.*

#### IV. OUTLOOK OF THE UNEMPLOYED

Still other factors explain why the unemployed represent at present no active social force. These factors lie in their outlook. The changes in the outlook of many of the unemployed which occur under the influence of their situation do not occur in all of them; and besides, they proceed slowly and by no means in one direction. Although a certain trend toward radicalism is undeniable, nevertheless under the influence of the same objective situation diametrically opposed tendencies are aroused.

Let us survey these changes in different fields.

1. *Religion.* Utterances which permit conclusions as to the attitudes of the writers toward religious questions are contained in 23 of the 57 biographies. Among those, eleven are positively religious and their faith seems to be unshaken, which does not prevent seven of them from having contemplated suicide. (Of the seven, one had really attempted suicide; two decided upon it; two intended to murder their families and themselves; and only one withheld from the act through religious motives.)

Only four contributors declare themselves decidedly negative toward religion. They admit their unbelief, and they claim that unbelief spreads among the unemployed.

A 21-year-old textile worker writes:

Who is still pious nowadays? Who believes that a just God should tolerate such injustice?

While in the whole material we do not find one single case of religious revival, eight cases permit an insight into the process of the loss of belief. Here are examples:

A 27-year-old unskilled laborer reports that he originally, as a Catholic, trusted in God's pity—sometimes I doubted even at that time—I was famished several times. Doubt about God's kindness pierced me again and again. My wife's faith in God began to weaken too.

A 31-year-old miner relates a stormy discussion among the unemployed after a sermon in which the priest stated as the cause of the crisis the sins of the people. The author was very indignant about it and declared such statements about the economic crisis destroyed the already weakening faith of the people.

So, in regard to the changes in the religious life of the unemployed we find apparent a certain tendency toward radicalism.

2. *Morals.* More ambiguous are the changes in regard to morals. We have already mentioned that misery forces the unemployed to make use of means of living which create moral conflicts. What is their attitude toward begging? In regard to this item we find 27 utterances: of these, nineteen condemn it and eight justify it. Formerly we showed that the official doles are felt as alms, and because of this the receivers feel humiliated.

If the attitude toward doles is such, it is not astonishing that genuine begging is energetically disapproved by many. The following words from one biography are typical of the whole group:

I want to work, not to beg. Anything rather than that.

A totally different attitude is reflected in the utterances of the minority who not only admit the fact of begging, but justify it.

Begging nowadays is not degrading. The unemployed man whom nobody helps very soon consumes everything he has, and before long stands at a crossroads from which lead only two ways, one to suicide, another to begging. Most choose the second way, and they comfort themselves that they are not alone in begging, but have thousands with them.

The resisted temptation to steal and its rejection on principle are mentioned in eight cases. Theft is admitted, however, in seven cases. Also among those who reject stealing as a solution for themselves personally, there are some who express their apprehension that their resistance will not last long. Besides, there are also some who, although they do not steal themselves, understand and justify those who do. "People break the law, in order to live, and that is their only crime." Criminality does not stimulate indignation any longer; it is regarded as unavoidable and obvious. The distinction between "legal" and "moral" becomes especially clear for the unemployed.

In the changes in the opinions of the unemployed in regard to morals we find two contrary tendencies. On the one hand there is a trend toward radicalism; on the other hand, a contrary tendency toward resignation which the individuals experience who get accustomed to begging.

3. *Social and Political Opinions.* What do the unemployed think are the causes of their situation? What are their opinions about the present economic crisis?

Of course they grumble a great deal among themselves about these issues. In our material there are 27 reflections about the causes, consequences, and the means of fighting the crisis. Among these one finds, naturally, echoes of all possible opinions which are propagated by the press and among sympathizers of all political parties.

About the causes of the crisis there are 19 comments. Only two admit that they stand perplexed by the question, "How did the crisis arise?" One reveals his ignorance only indirectly, when he says, "They created the crisis." Another agrees with this opinion and adds motivation of his own: "The capitalists created the crisis, to make labor more humble."

Besides there are quoted as causes of the crisis: the high salaries of executives and the large number of them; the high prices; the dumping system (special bitterness is evident in the frequent mention of high prices for sugar, which is exported to England at dumping prices, where it is fed to hogs); the competition of big factories with small trade; rationalization (the single worker worked too intensively); and finally the development of industrial technique.

Only twice is the opinion given that the crisis is a structural one and that unemployment will cease only with the capitalistic system. Similar ideas are expressed by those who are indignant about the burning of wheat and coffee (five times), although these contributors are not able to follow through their ideas, and put them in a clear sociological formula.

As a means of fighting the crisis, we find in seven biographies the following proposals: to elect from the poorest unemployed a cabinet member to work against the crisis in the framework of the present constitution; to exclude the causes of the crisis by legislation; to limit technique; not to employ foreigners, and not to buy any foreign goods; to start large public works; to lower prices; to nationalize industry.

The consequences of unemployment are mentioned in six biographies: the increase of criminality, of begging and prostitution, and of tuberculosis; development of the bribing system in factories; the break-down of solidarity among laborers; and the increase of the revolutionary mood (as threat or warning).

Only one of these remarks about the influence of unemployment on personality is here quoted:

The unemployed are people who gradually lose the sense of creativeness, for whom all building up, any contributing to the common welfare, remains unknown.

Of course the reflections about the personal and general social situation depend upon the grade of education, upon the mental activity, and upon the general political and religious attitude of the contributor.

Reflections which have a general social and political content are found in 30 biographies. On the basis of these utterances one cannot always conclude what the political orientation of the author is, because it is usually very vague. Nevertheless through direct and indirect data it stands out that eleven of the contributors admit being Socialists, in the broadest sense of the word. Four of them show a revolutionary attitude, while eight declare themselves as patriots devoted to State and constitution. From biographies one cannot see how far the political opinions of the writers were already formed before the crisis. Only in two cases of "left wing" authors is it clear that they became radical directly under the influence of the depression.

In only one point can the influence of the crisis be stated without any doubt: seven contributors clearly and emphatically state their disappointment and bitterness toward the State. They are all men who participated in the War of 1914-18 and also in 1918-20 against Russia, who fought for freedom and the welfare of the Fatherland and now feel themselves betrayed.

An unskilled laborer, about 30 years old, writes:

Now where is the Fatherland which the poets sing about, and which should be a mother for a citizen who loves his country? Was the fighting of the revolutionaries, of the proletarian heroes and the flower of the young workers for nothing? Should happiness and welfare be the lot of only a few lucky gamblers? Should the Fatherland be like this? Indignation fills me and I feel that I must go mad if I think about it any longer.

One should not conclude without caution from such statements that there is a ripe revolutionary attitude behind them. They are only expressions of the painful estrangement from the community, of the feeling of helplessness, of being forgotten, "locked out" or cast out. Such a feeling is, it is true, a condition for a revolutionary attitude, but it is not yet one by any means. The general impression which one gets in going through the biographies is that the experiences of unemployment are a preliminary step for the revolutionary mood, but that they do not lead by themselves to a readiness for mass action; metaphorically speaking, these experiences only fertilize the ground for revolution, but do not generate it. They can easily lead to outbreaks of distress in the form of single acts, but they leave the mass inert, since they lead to ever-increasing mutual estrangement, isolation, dispersion, destruction of solidarity, even to hostility among the laborers, and in this way they deprive the mass of its power. It seems worth while to stress this point, since it belies the popular idea about the psychological consequences of unemployment.

#### SUMMARY

Fifty-seven autobiographies of Polish unemployed, collected by the Institute of Social Economy in Warsaw, were analyzed in reference to their psychological content. The personal data and economic situation of the writers is given, their search for work



and other use of time described. Then follows a general description of the sequence of moods of the unemployed from the moment of loss of work; the material corroborates a distinction of types which was stated elsewhere (4). As particularly characteristic for the mental life of these unemployed are disclosed: an especially depressing feeling of humiliation and of being superfluous; an increased sensitivity; aggressiveness, which is nevertheless marked by a peculiar inertia; in connection with this a notable shift in class consciousness. Finally there are presented some changes which occur in the outlook of the unemployed in relation to religion, morals, and social and political issues.

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#### LES ÉFFETS PSYCHOLOGIQUES DU CHÔMAGE

##### (Résumé)

L'ouvrage examine cinquante-sept autobiographies de chômeurs recueillies par l'Institut de l'économie sociale à Varsovie en rapport avec leur contenu psychologique. Après avoir communiqué ces données personnelles ainsi que les conditions économiques des auteurs, on décrit leurs quêtes de travail et leur emploi de temps. Ces données sont suivies d'une description générale du changement de disposition dès le début du chômage; le matériel confirme une "typisation" trouvée ailleurs. Comme fait caractéristique dans la vie mentale de ces chômeurs on élucide l'oppression du sentiment d'être dégradé et superflu, une sensibilité intensifiée, une attitude agressive reconnue par une inertie particulière, en rapport avec laquelle on trouve une curieuse altération du sentiment de classe. A la fin on représente plusieurs changements dans le monde des chômeurs en rapport avec la religion, la morale, et des questions tenant à la politique sociale.

ZAWADZKI ET LAZARSFELD

## DIE PSYCHISCHEN FOLGEN DER ARBEITSLOSIGKEIT

(Referat)

Sieben und fünfzig Biographien von Arbeitslosen, gesammelt durch das Institut fuer Sozialwirtschaft in Warschau, werden auf ihren psychologischen Gehalt untersucht. Nachdem die Personaldaten und oekonomischen Verhaeltnisse der Schreiber mitgeteilt sind, wird ihre Arbeitssuch und sonstige Zeitverwendung beschrieben. Darauf folgt eine allgemeine Schilderung des Stimmungsverlaufes vom Moment des Arbeitsverlustes an; das Material bestaetigt eine anderwaertig gefundene Typisierung. Als besonders charakteristisch fuer das Seelenleben dieser Arbeitslosen wird herausgearbeitet: ein besonders drueckendes Gefuehl der Entwuerdigung und Ueberfluessigkeit; eine gesteigerte Sensibilitaet; eine Agressivitaet, die durch eine besondere Lahmheit gekennzeichnet ist; im Zusammenhang damit eine merkwuerdige Umwandlung des Klassenbewusstseins. Zum Schluss werden manche Veraenderungen im Weltbild des Arbeitslosen hinsichtlich Religion, Moral und sozialpolitischer Fragen dargestellt.

ZAWADZKI UND LAZARSFELD

# SHORT ARTICLES AND NOTES

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## A NOTE ON COLOR-BLINDNESS IN SOME PSYCHOTIC GROUPS

MARY S. MILLARD AND DAVID SHAKOW

### INTRODUCTION

In order to check on a clinically derived impression of a greater incidence of color-blindness among psychotic patients, the Ishihara Test (5) was given to a group of patients at the Worcester State Hospital. This test was selected because of the ease with which it is administered and its general acceptance as the most satisfactory clinical test of defective color vision.

The only previous study of psychotic patients which we have been able to discover is that of Hrdlička (4, pp. 340-341) who in a brief section of an article on various tests and measurements in a psychotic population reported a 1-per-cent incidence of "incomplete color-blindness" in 200 men and 0.5 per cent in the same number of women. He used "solutions representing the seven rainbow colors, placed in narrow glass tubes."

Since work on normal persons is well summarized in the studies of Haupt (3) and Miles (6), the literature will not be discussed except for comparative purposes.

### POPULATION AND METHOD

An attempt was made to administer the Ishihara Test to practically all of the male patients in the Worcester State Hospital during the period of January, 1931 to April, 1933, who were diagnosed as having dementia praecox, manic-depressive psychosis, alcoholic psychosis, and general paresis, and to all the female patients diagnosed dementia praecox. In all 1218 patients—683 male and 535 female—were examined, 839 giving representative results. Only those records were considered representative in which the subjects read the first plate correctly—all of the 839 were literate to this extent—and attempted to meet the conditions of the test in a satisfactory manner. Of these 538 were male: 329 dementia praecox, 79 alcoholic psychosis, 55 manic-depressive, 75 general paretic; and 301 were female dementia praecox patients. Of those who were not included 338 did not coöperate, and 41 male patients, though they did go through the test, did not do it in a way to meet the criteria for representativeness.

The test was used under adequate daylight conditions, with the book

placed from two to two and one-half feet from the subject. The plates were presented consecutively, plates 14, 15, and 16 being omitted. All tests were administered by the same examiner (the senior author), who had had considerable experience in giving psychometric examinations to psychotic persons. The patients were rated according to their coöperation and general attitude.

#### DEFINITIONS AND CRITERIA

Before discussing the criteria for color-blindness that were used, it is desirable to state clearly the definitions for the types of responses obtained. Responses have been divided into four groups:

1. *Correct.* The figures which should be read by normal persons, as given by Ishihara.

2. *Color-blind.* The figures which should be read by color-blind persons (of any type), as given by Ishihara.

3. *Anomalous.* Responses which do not fall into either of the above categories. These are incorrect responses which fall into one of the following classes:

- a. Responses which suggest the possibility that a correct figure was at least seen in part, e.g., 5 for 6 on Plate 7; 6 for 5 on Plate 8; 28 for 26 on Plate 12.

- b. Responses which suggest the possibility of a color-blind response being seen at least in part, e.g., 3 for 2 in Plate 11. This group is not large since where the possibility of a color-blind response being seen becomes somewhat more marked, the response is placed in the "Doubtful" category discussed below.

- c. Responses which are apparently due to some set adopted by the subject. The test situation places some pressure on him to report a figure even if not clearly seen. He may use any cue to construct such a figure, e.g., the response 40 for the correct response "nothing" in Plate 10.

- d. Responses which are unclassifiable in any of the above three classes of anomalous response.

4. *Doubtful.* Responses which are anomalous, but which definitely suggest that the subject saw a figure which is considered a color-blind response. Examples of these are: 8 on Plate 4; 71 or 24 on Plate 5.

Four different sets of criteria for color-blindness are used:

1. *The Miles criteria.* Two or more incorrect responses, either color-blind or anomalous, Plates 10 and 11 being excluded.

2. *The Worcester I criteria.* Two or more definitely color-blind responses in the complete series, i.e. including Plates 10 and 11. (This classification was made because it was felt desirable to administer the series in the standard way.)

3. *The Worcester II criteria.* One definitely color-blind response together with two or more doubtful ones; or, two definitely color-blind responses in the complete series. (This classification was added since we wanted to determine the probable maximum incidence of color-blindness in our psychotic population. It is obvious that even in dealing with psychotic persons doubtful responses should be given some consideration as probable color-blind responses.)

4. *The Worcester III criteria.* Two or more definitely color-blind responses on the series, excluding Plates 10 and 11. (This classification was added in order to have as strict a set of criteria as possible for comparison with Miles, since there is the possibility in dealing with a psychotic population of getting a greater number of anomalous responses.<sup>1</sup>)

### RESULTS

The table shows the number and percentage of red-green color-blind males for each diagnostic group and for Miles's (6) normal males. Only the results considered representative are included. Of the unrepresentative cases (N=41)—which are not included—the results obtained from two subjects suggested color-blindness. These were both male dementia praecox patients.

In the female dementia praecox group we found one color-blind case according to the Worcester I criteria, two according to the Worcester II

TABLE 1  
INCIDENCE OF RED-GREEN COLOR-BLINDNESS IN MALE SUBJECTS ON THE  
ISHIHARA TEST

Group	No. of cases examined	Miles's criteria*		Worcester I criteria		Worcester II criteria		Worcester III criteria	
		No.	Per-centage	No.	Per-centage	No.	Per-centage	No.	Per-centage
Manic-depressive	55	10	18	9	16	15	27	6	11
Alcoholic	79	15	19	7	9	20	25	5	6
General paresis	75	16	21	5	7	20	27	4	5
Dementia praecox	329	44	13	38	12	59	18	27	8
Total male patients	538	85	16	59	11	114	21	42	8
Miles's normals	1286	106	8.2	—	—	—	—	—	—

\*For definitions see text.

<sup>1</sup>Miles's group is the most satisfactory one available for comparative purposes, and we are therefore limiting ourselves to it. We feel that the incidence of color-blindness in his population would not be materially changed by his adoption of Worcester III criteria and that it is therefore valid to use it for comparison. If this assumption is not accepted, our conclusions must be interpreted as being biased in the direction of conservatism.



criteria, none according to the Worcester III criteria, and three according to Miles's criteria. The percentages of color-blindness are respectively 0.3 per cent, 0.7 per cent, 0.0 per cent, and 1.0 per cent.<sup>2</sup> No cases of blue-yellow blindness were discovered in either the male or female population. Two of the cases of red-green blindness were suspected of total color-blindness.

If Miles's criteria are used, the results on all psychotic types as well as for the total male psychotic group are distinctly higher than for the normals examined by Miles. The mean for the total group is approximately twice that for the normals. The  $D/\sigma$  diff. of the Miles group from each of the psychotic classifications in the order given in the table are: 1.89, 2.46, 2.72, and 2.67. That for the total group of male psychotics is 4.88, a significant difference. (These standard errors of the differences are figured on percentages, which is open to criticism. However, we feel that in the total group the number of cases is sufficiently large to make the results obtained fairly dependable.) The absence of definite significance in the separate classifications is probably due to the comparatively small number of cases in each.

By the stricter Worcester I criteria the incidence of color-blind cases is approximately equal to or slightly higher than Miles's. The differences from Miles's group are probably not significant. By the least strict (Worcester II) criteria the percentages are higher—probably significantly so in each group. By the strictest criteria—that of Worcester III—the incidence is approximately that of the Miles's group.

Although there is probably no significant difference by any of the criteria between types of psychoses, it is interesting to note the changes in the order of incidence when anomalous responses are eliminated—i.e., the use of Worcester III criteria rather than those of Miles. It is the two groups which are most likely to have definite organic involvement who are most affected—i.e., show a marked decrease in incidence. These are the general paretic and the alcoholic groups. It is in groups of this kind that we should expect agnosia-like symptoms. If this reasoning is valid, it emphasizes the necessity for using very strict criteria in judging color-blindness in such subjects.

Our results on female dementia-praecox patients fall within the range reported on normal women.

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<sup>2</sup>The relatively lower difference between the Miles and the Worcester III criteria found among female when compared with male dementia praecox patients may be accounted for by the fact that a much greater proportion of the women to whom the test was administered had to be eliminated because of lack of coöperation. It is legitimate to assume that it is from this group that the greatest proportion of anomalous responses would be obtained.

Since the method used by Hrdlička (4) was quite different from that used by us, comparisons can be made only with difficulty. His percentages are lower than ours for men and approximately the same for women. The former may be accounted for on the basis of differences in technique and the possible effects of chance selection.

No analysis is made from a racial point of view (1, 2) since our group contained few individuals belonging to races where the incidence is different from that of our unselected white population.

#### CONCLUSIONS

By the use of stricter-than-the-usual criteria for diagnosing color-blindness, the conclusion is reached that the incidence of color-blindness in a psychotic population such as ours is not significantly different from that of a normal population.

#### SUMMARY

1. The Ishihara Test for color-blindness was successfully administered to a group of 839 psychotic patients, 538 of whom were male.
2. The male patients included those of the diagnostic groups dementia praecox, alcoholic psychosis, manic-depressive psychosis, and general paresis. The female patients were all dementia praecox.
3. Stricter criteria than the usual ones were used for determining the presence of color-blindness.
4. By these criteria no differences were found in the incidence of some form of red-green blindness from that of a normal group.
5. No case of blue-yellow blindness was discovered.
6. Two of the cases of red-green blindness were suspected of being cases of total color-blindness.

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AGE AND OCCUPATIONAL FACTORS IN THE RESIDENTIAL PROPINQUITY OF MARRIAGE PARTNERS<sup>1</sup>

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## INTRODUCTION

It is assumed that people do not generally marry strangers, or friends whom they have not seen for years; they marry people whom they know well and have been seeing rather frequently for some time previous to the event. It is further assumed that during such courtship the man must make numerous trips between his own residence and that of the woman. Consequently one can expect that the distance between the residences of a man and a woman will be a definite factor in determining whether or not they ever become a married couple.

In a recent study (1) empirical support is furnished for the above statements. Five thousand consecutive marriage licenses issued in Philadelphia were tabulated according to the distance between the residences involved. The results show a very decided tendency to marry in one's immediate neighborhood. Seventeen per cent married within one block, 34 per cent within five blocks, 52 per cent within a mile. Only 18 per cent married someone not living in Philadelphia at the time.

The present paper is an analysis of the age and occupational factors which might be shown to bear upon this residential propinquity of couples applying for marriage licenses.

## PROCEDURE

The records of the Marriage License Bureau of Lehigh County, Pennsylvania, were examined at the county court house at Allentown, and the age, address, and occupation of each applicant taken down for each application for the year 1930 in which one or both parties resided in Allentown (population approximately 100,000). From a city map the distance in blocks between the residences of the two parties to each application was calculated, up to 20 blocks. All distances over that amount were lumped together. Applications where one party lived outside of Allentown were classified as within 20 miles or over 20 miles. A total of 583 licenses was involved. Distributions for distance were then worked out, first in the aggregate and then by age and occupation as follows:

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<sup>1</sup>Presented at the New York Branch meeting, American Psychological Association, New York University, April 7, 1934.

Age of the man	N
21 and under	142
22-31	312
32 and over	109
Occupation of the man	
Laborers and unskilled	190
Artisans and skilled	209
Clerical, business and professional	178

## RESULTS

The aggregate distribution shows in general the same shape as Bossard's, except that the tendency for close residential propinquity is not so marked; only 17 per cent are within 5 blocks, and 41 per cent within a mile; and 36 per cent are out of town. This last difference may be more apparent than real, since the area of Philadelphia includes within itself distances easily as great as the distances between Allentown and several of the places listed as "out-of-town" in the present study.

The age and occupational distance distributions are shown in Table 1.

TABLE 1

Percentage	Age			Occupation		
	21 and under	22-31	32 and over	Laborers, etc.	Artisans, etc.	Clerical, etc.
Within 5 blocks	19	13	27	22	19	10
6-10 blocks	11	9	4	8	7	11
10-20 blocks	20	14	12	18	14	13
Over a mile	21	22	20	16	24	28
Within 20 miles	25	30	21	31	27	19
Over 20 miles	4	12	16	5	9	19
	100	100	100	100	100	100

A number of suggestive differences appear. First as to age, there is: (1) a drop in the percentage marrying very close to home, as one goes from the youngest to the next oldest age group; (2) a sharp rise therein in the oldest group; and (3) a steady rise in the percentage marrying over 20 miles away as one goes up the age scale. In trying to account offhand for these variations one could point out regarding (1) above that those under 21 are most likely to be limited in their social contacts; that (2) those in their forties and fifties are likely not to gad about too much; and that (3) the older one gets the more contacts he has probably made, and in some cases he is more likely to own an automobile.

As to occupational differences: as one goes up the occupational hierarchy one finds (1) a decline in the percentage of marriages within five blocks; (2) a steady increase in the percentage over a mile away, in Allentown;

and (3) a marked increase in the percentage of marriages over 20 miles away. All these differences might be attributed to the greater discriminatory powers which might be alleged to be the possession of the higher occupational groups; or they could be due merely to the greater mobility resulting from larger incomes. At any rate, the differences here seem quite clear cut.

Before speculating further as to the psychological or material explanations for these age and occupational differences, it was deemed advisable to check on the validity thereof by partialing out each factor from the other. This involved tabulating by occupation for each age group, and by age for each occupational group.

When done for the "over 20 miles" classification (Table 2) we see that

TABLE 2  
PERCENTAGE OVER 20 MILES

Occupation			Age		
Laborers, etc.	21 and under	0	21 and under	Laborers, etc.	0
	22-31	8		Artisans, etc.	4
	32 and over	6		Clerical, etc.	10
Artisans, etc.	21 and under	4	22-31	Laborers, etc.	8
	22-31	6		Artisans, etc.	6
	32 and over	23		Clerical, etc.	20
Clerical, etc.	21 and under	10	32 and over	Laborers, etc.	6
	22-31	20		Artisans, etc.	23
	32 and over	22		Clerical, etc.	22

the youngest age group has the smallest percentage of such marriages in all three occupational groups. In only two of the age groups does the labor group have the smallest percentage. The oldest age group has the largest percentage of such marriages in only two occupational groupings—possibly because in the third, the laboring group, there is less likelihood of the oldsters being best able to afford a car. The business occupational group has the largest percentage in two of the three age groups.

TABLE 3  
PERCENTAGE WITHIN 5 BLOCKS

Occupation			Age		
Laborers, etc.	21 and under	26	21 and under	Laborers, etc.	26
	22-31	17		Artisans, etc.	18
	32 and over	29		Clerical, etc.	6
Artisans, etc.	21 and under	18	22-31	Laborers, etc.	17
	22-31	14		Artisans, etc.	14
	32 and over	32		Clerical, etc.	10
Clerical, etc.	21 and under	6	32 and over	Laborers, etc.	29
	22-31	10		Artisans, etc.	32
	32 and over	16		Clerical, etc.	16



Making the same classification for the "within five blocks" marriages (Table 3), we find that the middle age group has the smallest percentage of such marriages in only two of the three occupational groups, while the oldest group has the largest percentage in all three occupational groups (though the margin is rather small in one). The laboring group has the largest percentage in all three age groups, but the clerical-business-professional group has the smallest percentage in only two.

In the "over a mile, in Allentown" marriages (Table 4) we find that in all three age groups the laborers form the smallest percentage, although the clerical-business-professional group is highest in only the two older age groups.

TABLE 4  
PERCENTAGE OVER A MILE, IN ALLENTOWN

Age	Occupation	
21 and under	Laborers, etc.	19
	Artisans, etc.	24
	Clerical, etc.	23
22-31	Laborers, etc.	14
	Artisans, etc.	23
	Clerical, etc.	29
32 and over	Laborers, etc.	9
	Artisans, etc.	18
	Clerical, etc.	35

#### DISCUSSION

The results on occupational differences all point to the same conclusion, namely the so-called upper classes are consistently less affected by residential propinquity in their choice of marriage partners than are the so-called lower classes.

The results on age are not so clear. The oldest group shows consistently the largest proportion of marriages very close to home, but also shows the largest proportion of marriages over 20 miles away, in two out of the three occupational groups. And the youngest group shows consistently the smallest percentage of marriages over 20 miles away, while the middle age group shows the smallest proportion of marriages very close to home, in two out of the three occupational groupings. The age factor evidently does not have a linear correlation with whatever makes for residential propinquity. And undoubtedly other factors than age and occupation affect this variable. For example, I daresay the residential propinquity here investigated will be much greater in a city divided up into clearly differentiated racial districts than in a city not so divided. In fact, the main result of the present investigation—the occupational difference in residential propinquity—might very well be due to the "laborers" living in close-knit racial groups while the "upper" classes, more largely native-born, do not.

## SUMMARY

There seems to be a clear-cut and consistent evidence that:

1. Those 21 and under show the smallest proportion of marriages over 20 miles away.
  2. Those 32 and over show the largest proportion of marriages within five blocks.
  3. Laborers and unskilled workers show the largest proportion of marriages within five blocks.
  4. Laborers and unskilled show the smallest proportion of marriages over a mile away, in town.
- In addition there is evidence, but not so clear-cut, that:
5. Laborers and unskilled workers show the smallest proportion of marriages over 20 miles away.
  6. Clericals, business men, and professionals show the largest proportion of such marriages.
  7. Those 32 and over show the largest proportion of such marriages.
  8. The middle age group has the smallest proportion of marriages within five blocks.
  9. The clerical, business, and professional group has the smallest proportion of such marriages.
  10. The clerical, business, and professional group has the largest proportion of marriages over a mile away in Allentown.

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MADISON BENTLEY AND E. V. COWDRY. *The Problem of Mental Disorder*. New York: McGraw-Hill, 1934. Pp. x+388. \$4.00.

This is the report of the Committee on Psychiatric Investigations of the National Research Council, and was supported by a grant from the Carnegie Corporation. It attempts to be a sort of stock-taking of the problem, and is divided into two parts: (1) the presentation of the respective viewpoints of five men professionally engaged in the study and treatment of psychosis, and (2) statements from representatives of twenty sciences as to what these disciplines are now prepared to furnish of relevance to the problem of disorder. The authors contribute summary and interpretive material, and are also represented in the contributions of their respective sciences, namely psychology and cytology.

It is probably not remarkable that the net outcome of all this conscientious documentation is pretty small; most persons of average information in the field would probably have guessed *a priori* that the "supporting sciences," whatever they ought to be, were not a particularly promising place to look for real help in the psychosis problem. One may freely admit, formally, that a thorough grounding in cytology, genetics, or pharmacology is desirable for a psychiatrist; so also is a thorough grounding in anthropology for a banker, or a thorough grounding in meteorology for an economist; still, most bankers will not suffer too greatly professionally by concentrating in the study of finance, and presumably the bulk of progress in the understanding of mental disorder may be expected from the study of mental symptoms in their own right, not excluding, of course, their correlates. Thus it is not surprising that most of the chapters have a distinctly hollow sound, as of a somewhat bewildered specialist suddenly called upon to justify the application of his specialty to a field in which he didn't know it applied. For all that, of course, the work is far from useless; a survey which establishes on the basis of careful examination which directions are *not* fruitful is likely to save a great deal of time in the long run.

While the search for new and promising viewpoints or stimulating statements of old ones is discouraging, it is not completely hopeless. The chapter by Jacobson on action currents, especially in muscle, as correlated with carefully controlled psychological events seems to hold a good deal of promise, as does that by the Yerkes on the possibility of studying artificially controlled disorders in the apes. From the point of view of the clinical psychologist as against that of the general psychiatrist, the last three chapters, all from what might be called the situational approach, are perhaps the most provocative, though the problem (as usual) has not been generalized; the same

applies to the psychoanalytical viewpoint, which is represented in the first but not the second section; it is set forth with admirable restraint by Kubie, but without trace of the generalized formulation which it so badly needs and for which the rigid background of its adherents seems to unfit them. The long chapter on psychology by Bentley would naturally attract attention, but one is somewhat at a loss to determine precisely what the point is; there is a good deal of excellent history, some complaints about other viewpoints than the author's (which at least in the case of the psychoanalytic is misunderstood) and the concept of government, which seems to be an announcement of the principle that effects have causes; but it remains difficult to understand just what contribution general and experimental psychology are conceived to have for the problem of disorder.

The job has been conscientiously and thoroughly done, and all persons concerned with the field may be glad that this is so; we know now where *not* to look. After these amenities, those sufficiently fortunately placed may turn with relieved mind to perhaps the only avenue not particularly exploited in the volume—the careful observation, with experiment where this would clarify the situation, of the raw facts of mental disorder and their correlates, by the usual methods of science: observation, inference, induction, verification, deduction.

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## PERSONALITY FACTORS IN MARITAL COMPATIBILITY: II.

*From the Department of Psychology, Stanford University*

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### RELATION OF MARITAL HAPPINESS TO HUSBAND-WIFE RESEMBLANCES IN TRAIT-SCORES

Is the mere fact of resemblance or difference between spouses in the traits measured favorable or unfavorable to marital compatibility? There is a popular opinion that unlike or even directly opposed types of personality are attracted to each other and that such matings are favorable to marital happiness. However, investigations of marital selection have usually revealed positive rather than negative correlations between spouses in such traits as height or weight, intelligence, education, and social-economic status. Less information exists as to the direction of marital selection, if any occurs, in the case of qualities related to personality.

We have computed husband-wife correlations on the thirteen personality variables and on schooling for 341 married couples, and for 109 divorced couples. Our interest, of course, is not primarily to discover the extent to which marital selection in these traits has taken place, important as this is, but to find out whether the selection that occurs is in any way related to marital success. We have accordingly divided the married subjects into two groups, one composed of 126 couples with highest happiness scores, the other composed of 215 couples with the lowest scores. Table 16 gives the husband-wife correlations for these groups separately and for the divorced group.

It is evident from this table that the characteristics of personality measured by these tests have played little part in marital selection in any of the groups. The moderately high correlations for schooling are about of the order of magnitude found in other investigations, but these too fail to show significant differences between the groups. Of the thirteen test variables, in only one (interest score for "Y. M. C. A. Director") is the correlation for the most happily married group significantly higher than for both of the other groups. The

TABLE 16  
HUSBAND-WIFE CORRELATIONS ON PERSONALITY VARIABLES AND ON  
SCHOOLING  
(Unmatched groups)

	Married couples, happiness scores 8 or 9 (high) N=126	Married couples, happiness scores 1 to 7 (low) N=215	Divorced couples N=109
C. P. A.	.202±.058	.037±.046	.026±.065
Chemist	.125±.059	.076±.046	.146±.063
Lawyer	.424±.049	.167±.045	.345±.057
Life insurance salesman	.289±.055	.244±.043	.304±.058
Teacher	.242±.057	.295±.042	.231±.061
Y. M. C. A.	.358±.053	.133±.045	.115±.064
Office clerk	.410±.050	.294±.042	.226±.061
Interest maturity	.300±.055	.256±.043	.322±.058
M. F.	.029±.060	.085±.046	— .012±.065
B1-N	.108±.060	.217±.044	.044±.065
B2-S	.074±.060	.121±.045	.059±.064
B3-I	.020±.060	.165±.045	.072±.064
B4-D	.241±.057	.289±.042	.016±.065
Schooling	.446±.048	.487±.035	.485±.049

correlations for C. P. A. show a similar difference but smaller. In the case of "dominance," both married groups yield significantly higher correlations than the divorced group. In "lawyer" interest both the divorced group and the more happily married group show higher correlations than the less happily married, a finding so inconsistent that one is inclined to impute it to chance. The only other group difference approaching statistical significance is that between the less happily married and the divorced in "neurotic tendency," the former showing the greater resemblance.

Of the 39 test correlations for the three groups, all but one are positive, the exception being  $-.012 \pm .065$ . Despite the smallness of most of the correlations, the evidence points consistently to the conclusion that such selection as takes place in these traits is in the direction of "like" rather than "unlike" matings, unless indeed the slight tendency of husbands and wives to resemble one another is the result of their having lived together. If the latter explanation were valid, divorced couples should yield lower correlations than the married groups, which is not the case to any very significant extent.

There is some evidence of marital selection in the case of the following variables: "Lawyer," "Life Insurance Salesman," "Teacher,"

"Office Clerk," and "Interest Maturity." Since "interest maturity" is largely a function of age, and since the husband-wife correlation for age is high, the correlations for "interest maturity" are to some extent spuriously high.

Table 17 gives the correlations between each spouse's trait scores

TABLE 17  
CORRELATION OF TRAIT SCORES WITH MARITAL HAPPINESS SCORES, SEPARATELY  
FOR HUSBANDS AND WIVES  
(Married group, 341 couples)

Husband's trait scores on:	Wife's happiness score	Husband's happiness score	Wife's trait scores on:	Husband's happiness score	Wife's happiness score
C. P. A.	.071	.070	C. P. A.	— .025	.008
Chemist	.084	.130	Chemist	.069	.073
Lawyer	.014	.086	Lawyer	.062	.053
Life insurance salesman	— .123	— .098	Life insurance salesman	.019	.009
Teacher	.198	.125	Teacher	— .029	.021
Y. M. C. A.	.086	— .007	Y. M. C. A.	— .012	— .028
Office clerk	— .020	— .088	Office clerk	— .074	— .019
Interest maturity	.137	.147	Interest maturity	.041	.020
M. F.	.085	— .031	M. F.	.047	.031
B1-N	— .130	— .222	B1-N	— .140	— .144
B2-S	— .019	.042	B2-S	— .059	— .112
B3-I	— .156	— .244	B3-I	— .123	— .142
B4-D	.044	.137	B4-D	.124	.072
Schooling	.115	.099	Schooling	.016	.042

and the happiness scores of husband and of wife taken separately. The data in this table have a more specific bearing on the issue under consideration than those of the preceding table.

The probable errors of the correlations in Table 17 are low, ranging from .034 to .037 and giving statistical significance to a number of the coefficients. Correlations of .10 or more in the table have been italicized as being at least suggestive of a trend. Only three are as high as .20: husband's "teacher" interest with wife's happiness (+.198); husband's "neurotic tendency" with his own happiness (— .222); husband's "introversion" with his own happiness (— .244). These reduce to two, as "introversion" and "neurotic tendency" are practically one trait. Of the 28 correlations of husband's trait scores, only twelve are as high as .10; of the wife's, only six. No trait score of the wife correlates more than .144 with the happiness score

of either the husband or wife. "Teacher" interest on the part of the husband has the distinction of correlating more highly with the wife's happiness than any other trait in the list. The husband's "neurotic tendency" (or "introversion") has less effect upon his wife's happiness than upon his own! This trait in the wife affects about equally her own happiness and her husband's, but neither to any considerable extent.

Contrary to popular opinion, the wife's "dominance" score correlates positively instead of negatively with her husband's happiness. "Dominance" in the husband correlates positively with his own happiness but practically zero with his wife's. The husband's "interest maturity" correlates positively, though only slightly, with both his wife's happiness and his own, but the wife's score in this trait is not significantly related to either her husband's happiness or her own. The wife's "self sufficiency" score correlates negatively with her own happiness but not significantly with her husband's. The wife's schooling has no bearing on marital happiness, but both correlations of husband's schooling with happiness score are positive and approach significance.

Only two of the correlations are high enough to have appreciable value in predicting marital happiness: the positive correlation between husband's "teacher" interest and his wife's happiness, and the negative correlation between husband's "neurotic tendency" (or "introversion") and his own happiness. Prediction could doubtless be improved to some extent by the multiple correlation technique, but the zero-order coefficients are so low as hardly to justify the labor that this would involve.

One possibility remains of finding predictive values in the scores of these variables; namely, from an examination of the difference-scores between husband and wife. Even though the absolute score of neither husband nor wife on a given variable is correlated significantly with the happiness score of either, it is conceivable that the difference between their scores might be, especially if account were taken of the direction of the difference.

Table 18 gives the results of such a treatment of the data. The raw scores of both husbands and wives were transmuted into z-scores, or units of deviation from their respective means. The differences between a husband's z-score and his wife's z-score, for each trait, were then coded from 1 to 17, a low score indicating that the hus-

TABLE 18  
CORRELATION OF DIFFERENCE-SCORES IN THE TRAITS WITH MARITAL  
HAPPINESS  
(341 married couples)

Husband-wife difference on	Correlation with marital happiness
C. P. A.	— .060
Chemist	— .004
Lawyer	— .018
Life insurance salesman	.101
Teacher	— .161
Y. M. C. A.	— .047
Office clerk	.036
Interest maturity	— .104
Mental masculinity	.108
B1-N	.015
B2-S	— .070
B3-I	.056
B4-D	.005
Schooling	.088

band's *z*-score is higher than his wife's in a given trait, and that the wife's is lower than her husband's. Such a score signifies that the husband, relative to husbands in general, stands higher in the trait in question than does his wife relative to wives in general. It does not necessarily indicate which spouse has the higher *raw* trait-score. The median code-score, 9, signifies that husband and wife have the same *z*-score in the trait. This might be anything from low to high; e.g., both husband and wife might be extreme introverts or extreme extroverts. The difference-scores were then correlated with the average happiness score of husband and wife. In Table 18 *positive* correlation indicates association between high happiness score and *wife-superiority* to husband in the trait; *negative* correlation indicates association between high happiness and *husband-superiority* in the trait.

Figures 1, 2, and 3 present graphically the low association between marital happiness and difference-scores in three of the Bernreuter variables: "neurotic tendency," "self sufficiency," and "dominance."

Only four of the correlations in Table 18 are as high as .10 and only one ("teacher" interest) is above this figure. Husband-superiority to wife in "teacher" interest and "interest maturity" is associated with greater marital happiness, as is also wife-superiority (husband-



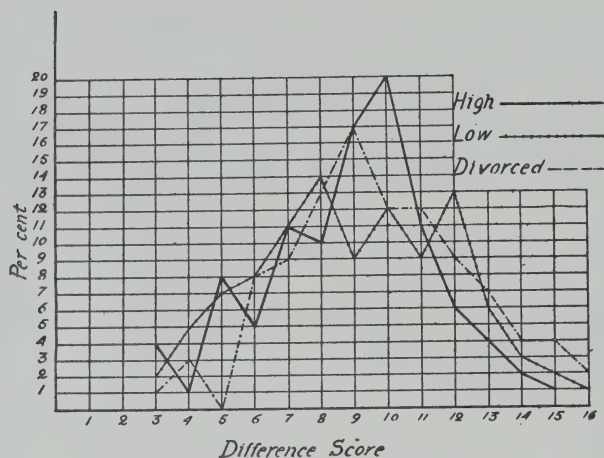


FIGURE 1

DISTRIBUTIONS OF HUSBAND-WIFE DIFFERENCE SCORES IN "NEUROTIC TENDENCY" FOR H, L, AND D GROUPS  
(100 couples in each group)

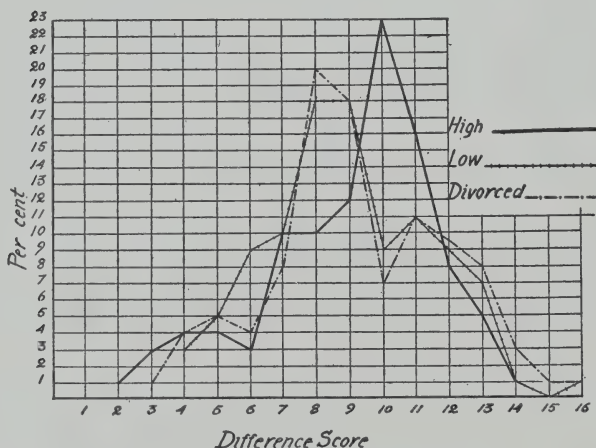


FIGURE 2

DISTRIBUTIONS OF HUSBAND-WIFE DIFFERENCE SCORES IN "SELF SUFFICIENCY" FOR H, L, AND D GROUPS  
(100 couples in each group)

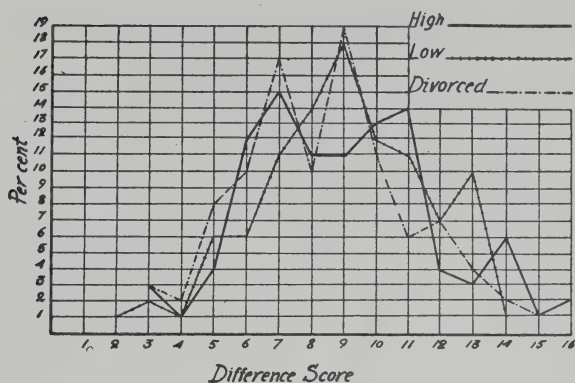


FIGURE 3

DISTRIBUTIONS OF HUSBAND-WIFE DIFFERENCE SCORES IN "DOMINANCE" FOR H, L, AND D GROUPS  
(100 couples in each group)

inferiority) in "life insurance salesman" interest and "mental masculinity." The only possibility of improving the predictive value of the trait scores would have to lie in the direction of improving the ratings on marital happiness. That this is open to improvement may be freely conceded, but in view of the near-negative results from comparison of the scores of the most happily married with those of the divorced group (p. 283 ff.), it seems unlikely that a better criterion of happiness would improve prediction to any considerable extent.

Pending the improvement of current instruments for measuring personality, and pending especially the identification and psychological description of the most important personality variables, it seems necessary to look for an alternative approach to our problem. One such approach is suggested by the analysis that has been made of the responses of the H, L, and D groups to the 545 individual items of the personality tests used. It is conceivable that a method of prediction could be worked out which would be based on the association found between marital happiness and the responses to empirically selected items. The following section deals with this possibility.

### HUSBAND-WIFE CORRELATIONS ON THE INDIVIDUAL ITEMS OF THE STRONG AND BERNREUTER TESTS

Husband-wife correlations (tetrachoric) were computed for each of the 545 test items, separately for the H, L, and D matched groups. The point of interest was not the absolute amount of husband-wife agreement or disagreement in the three groups, for a given item, but the relative amount of correlation yielded by the three groups. The search was for items which would show a significant difference between the correlation for the H group on the one hand and for the L and D groups on the other. The correlation for the H group might be either positive or negative, so long as the coefficient differed sufficiently from either or both of those for the L and D groups (preferably, of course, from both).

These tetrachoric coefficients of marital resemblance were computed by means of Chesire, Saffir, and Thurstone's diagrams (2). Values calculated from these diagrams agree to two decimal places with those computed by means of Pearson's and Lee's tables. Since three answers are possible in the case of each item (Yes, ?, No for Bernreuter; Like, Indifferent, Dislike for Strong), the distribution of husbands' answers by wives' answers yields a 3-by-3 table. To compute the tetrachoric  $r$ , such a nine-fold table must be reduced to four-fold form. This reduction may be effected in two ways, (1) by throwing the "I" and "D" answers into a single category as against the "L" answers, and (2) by lumping the "L" and "I" answers as against the "D". For the responses of each of the H, L, and D groups, tetrachoric  $r$ 's were computed separately for each of the two response-divisions, and the average of the two  $r$ 's so found was taken as the value for the item in question.

Table 19 presents all the correlations which showed large enough difference between the H group and either the L or D group to suggest that it was probably not due to chance factors. This is far from saying that the L and D divergences from H in the table are certainly significant. We have not computed the exact degree of significance of the differences for the reason that the determination of the probable error of a tetrachoric correlation is beyond the bounds of what is practicable in the case of so large a number of coefficients.<sup>1</sup>

<sup>1</sup>

$$\text{P.E.}_{\text{tet.}} = \left\{ .6745 \sqrt{(1-r^2)} \left[ 1 - \frac{(\sin^{-1} r)^2}{90^\circ} \right] \right\} \frac{\sqrt{p q p' q'}}{z z' \sqrt{N}}$$

(Kelley, 1, p. 258.)

TABLE 19  
HUSBAND-WIFE CORRELATIONS ON INDIVIDUAL TEST ITEMS FOR  
H, L, AND D MATCHED GROUPS  
(B=Bernreuter, S=Strong)

		H	L	D	Great- est Diff.	Aver- age Diff.	Agreement favors happiness or un- happiness
B	1						
	Uncomfortable to be different or uncon- ventional?	.06	— .19	— .21	.27	.26	H
B	4						
	Ever crossed street to avoid meeting a person?	— .10	.28	.25	.38	.365	U
B	10						
	Easily discouraged when opinions of others differ from your own?	.64	.15	.25	.49	.44	H
B	13						
	Athletics interest you more than intellectual affairs?	.42	.34	.04	.38	.23	H
B	17						
	Affected by praise or blame of many people?	— .16	.18	.17	.34	.335	U
B	26						
	Frequently feel grouchy	.32	— .03	.40	.35	.135	?
B	36						
	Ever solicited funds for a cause?	.49	.40	.20	.29	.19	H
B	38						
	Conversation more helpful in formulating ideas than reading?	.27	.16	— .07	.34	.225	H
B	43						
	Like to bear responsi- bilities alone?	.34	.16	.12	.22	.20	H
B	47						
	Want someone with you when you receive bad news?	.31	— .16	.14	.47	.32	H
B	48						
	Bothered to have people watch you at work?	.09	— .19	— .05	.28	.21	H
B	50						
	Avoid arguments?	.49	— .39	— .40	.89	.885	H
B	52						
	Prefer to do your plan- ning alone?	— .08	— .05	.32	.40	.215	U
B	53						
	Find telling others of your own personal good news is the greatest part of the enjoyment of it?	— .14	— .05	.13	.27	.18	U
B	54						
	Often feel lonesome with other people?	.31	.15	— .12	.43	.295	H
B	55						
	Thrifty and careful about making loans?	.04	.28	.36	.32	.28	U

TABLE 19 (*continued*)

		H	L	D	Great- est Diff.	Aver- age Diff.	Agreement favors happiness or un- happiness
B 60	Ever rewrite letters before mailing them?	— .12	.15	.16	.28	.275	U
B 67	People ever come to you for advice?	.31	.05	?	?	?	H
B 70	Like attention from acquaintances when ill?	.41	— .12	.09	.53	.425	H
B 75	Play your best even when opponent superior?	.22	— .06	— .14	.36	.32	H
B 78	When in low spirits try to find someone to cheer you up?	— .08	.00	.19	.27	.175	U
B 79	Understand problem better by studying it alone than by dis- cussing it?	.00	.40	.04	.40	.22	U
B 80	Lack self confidence?	.38	— .02	.04	.40	.37	H
B 82	Willing to take chance alone in doubtful situation?	.40	.12	— .07	.47	.375	H
B 84	Usually avoid asking advice?	.22	.12	— .10	.32	.21	H
B 88	Rather stand when late at meeting than take front seat?	.18	— .04	— .25	.43	.325	H
B 92	Ever argue a point with respected older person?	.38	.15	— .05	.43	.33	H
B 95	"Have it out" with a person who spread untrue rumors about you?	.30	.14	— .02	.32	.24	H
B 97	People more stimu- lating to you than anything else?	.13	— .11	— .14	.27	.255	H
B 98	Prefer a play to a dance?	.81	.35	.16	.65	.555	H
B 100	Prefer to be alone at times of emotional stress?	.50	.03	.30	.47	.335	H
B 101	Usually prefer to work with others?	.21	.11	— .06	.27	.185	H



TABLE 19 (continued)

		H	L	D	Great- est Diff.	Aver- age Diff.	Agreement favors happiness or un- happiness
B 102	Usually work better when praised?	.24	— .15	— .11	.39	.37	H
B 104	Feelings alternate be- tween happiness and sadness without reason?	— .08	.13	.28	.36	.285	U
B 112	Prefer making hurried decisions alone?	.20	— .18	— .13	.38	.355	H
B 115	Often in a state of excitement?	.20	— .22	— .01	.42	.315	H
B 121	Like to be with other people a great deal?	.25	— .01	— .04	.29	.275	H
B 122	Can be optimistic when others depressed?	— .17	— .12	.17	.34	.195	U
B 123	Does discipline make you discontented?	— .24	.01	.16	.40	.325	U
B 124	Are you usually con- sidered indifferent to opposite sex?	.45	— .08	.04	.53	.47	H
S 6	Astronomer	— .13	.06	.36	.49	.34	U
S 16	Bookkeeper	.06	.30	.23	.24	.205	U
S 17	Building contractor	— .02	.14	.23	.25	.205	U
S 22	Certified public accountant	.04	.25	.22	.21	.195	U
S 29	Dentist	.37	.09	— .38	.75	.515	H
S 43	Interior decorator	.29	.13	— .12	.41	.285	H
S 45	Inventor	— .16	.00	.29	.45	.305	U
S 50	Landscape gardener	— .14	.30	.25	.44	.415	U
S 51	Lawyer, criminal	.38	.13	— .04	.42	.335	H
S 53	Librarian	— .26	.28	.17	.54	.485	U
S 54	Life insurance salesman	.63	— .10	— .14	.77	.75	H
S 66	Orchestra conductor	— .13	.24	.13	.37	.315	U
S 69	Physician	.19	— .04	— .03	.23	.225	H
S 74	Private secretary	.22	.02	— .15	.37	.285	H
S 76	Rancher	.46	.11	.19	.57	.31	H
S 77	Real estate salesman	.13	— .04	— .24	.37	.27	H
S 79	Reporter, sporting page	.24	.23	— .14	.37	.195	H
S 86	Secret service man	— .05	.17	.39	.44	.33	U
S 89	Social worker	.36	— .06	.27	.42	.255	H
S 93	Surgeon	.23	.15	— .20	.43	.255	H
S 100	Worker in Y. M. C. A., etc.	.39	.09	.20	.30	.245	H

TABLE 19 (*continued*)

		H	L	D	Great- est Diff.	Aver- age Diff.	Agreement favors happiness or un- happiness
S 111	Bridge	.66	.53	.23	.43	.28	H
S 116	Playing a musical instrument	.40	— .06	.30	.46	.28	H
S 120	Chopping wood	.16	— .32	— .02	.48	.33	H
S 121	Amusement parks	.39	.19	.03	.36	.28	H
S 122	Picnics	.39	.20	.08	.31	.25	H
S 123	Excursions	.31	.09	.28	.22	.125	H
S 124	Smokers (party)	.33	.25	— .18	.51	.295	H
S 126	Conventions (meet- ings)	.39	.31	.14	.25	.165	H
S 127	Full-dress affairs	.37	.23	.09	.28	.21	H
S 134	Musical comedy	.57	.52	.38	.19	.12	H
S 135	Symphony concerts	.45	.34	— .13	.58	.345	H
S 136	Pet canaries	.49	.02	.26	.47	.35	H
S 139	Sporting pages	.51	.14	.21	.37	.335	H
S 148	"Popular Mechanics"	.47	.52	.10	.37	.16	H
S 157	Arithmetic	.01	.40	.12	.39	.25	U
S 174	Literature	.34	— .30	.40	.64	.29	?
S 187	Public Speaking	— .17	.25	— .03	.42	.28	U
S 197	Repairing electrical wiring	— .02	— .30	— .06	.28	.16	H
S 199	Operating machinery	.18	— .44	.16	.62	.32	H
S 206	Interviewing prospects in selling	.26	.02	— .07	.33	.285	H
S 208	Making a speech	— .02	.10	— .33	.31	.095	?
S 212	Teaching adults	.50	.08	— .23	.73	.575	H
S 217	Meeting new situa- tions	.32	— .03	— .06	.38	.365	H
S 221	Doing research work	.09	.33	— .23	.32	.04	?
S 229	Displaying merchan- dise in a store	.17	— .12	— .06	.29	.26	H
S 234	Regular hours of work	.25	— .10	— .10	.35	.35	H
S 239	Saving money	.04	.19	.32	.28	.215	U
S 240	Contributing to charity	.52	.16	.10	.42	.39	H
S 241	Raising money for charity	.50	.18	.10	.40	.36	H
S 245	Looking at a collec- tion of antique furniture	.44	— .02	.12	.46	.39	H
S 247	Conservative people	.38	.23	— .08	.46	.305	H
S 248	Energetic people	.53	.02	.18	.51	.43	H
S 250	People who borrow things	.23	.16	— .33	.56	.315	H
S 251	Quick-tempered people	.34	— .11	.03	.45	.38	H

TABLE 19 (*continued*)

		H	L	D	Great- est Diff.	Aver- age Diff.	Agreement favors happiness or un- happiness
S 253	Pessimists	.29	.12	— .30	.59	.38	H
S 261	Talkative people	— .06	.30	.22	.36	.32	U
S 263	Irreligious people	— .07	.06	.38	.45	.29	U
S 264	People who have done you favors	.40	.17	— .11	.51	.37	H
S 266	Gruff men	.48	.37	.13	.35	.23	H
S 273	Very old people	.44	— .02	.31	.46	.295	H
S 293	Teetotalers	.48	.41	— .17	.65	.36	H
S 296	Men who use perfume	.42	— .02	— .11	.53	.485	H
S 299	Develop theory of a new machine, e.g., auto	.16	— .21	.12	.37	.205	H
S 302	Determine cost of operation of machine	— .22	— .06	.14	.36	.26	U
S 305	Sell machine	.30	.04	.03	.27	.265	H
S 306	Prepare advertising for machine	.24	.16	— .02	.26	.17	H
S 310	Steadiness and perma- nence of work	.27	— .05	.00	.32	.295	H
S 311	Opportunity for promo- tion	.21	.10	.00	.21	.16	H
S 315	Opportunity to understand how superior expects work to be done	.42	.14	— .02	.44	.36	H
S 321	Thomas A. Edison	.44	.03	.21	.41	.32	H
S 325	J. J. Pershing, soldier	.44	.00	.08	.44	.40	H
S 327	Booth Tarkington, author	.10	.27	.34	.24	.205	U
S 328	John Wanamaker, merchant	.48	.15	.30	.33	.255	H
S 329	(To be) president of a society	.25	.13	— .30	.55	.335	H
S 339	Street car conductor vs. motorman	.40	— .05	— .06	.46	.455	H
S 353	Definite salary vs. commission	.43	— .10	.03	.53	.465	H
S 357	Selling article quoted 10% above cost vs. 10% below cost	— .07	.08	.30	.37	.26	U
S 362	Great variety vs. sim- ilarity of work	.35	— .23	.08	.58	.425	H
S 365	Technical vs. supervisory responsibility	.29	.20	— .04	.33	.21	H
S 371	Reading book vs. going to movies	.30	.19	— .08	.38	.245	H

TABLE 19 (*continued*)

		H	L	D	Great- est Diff.	Aver- age Diff.	Agreement favors happiness or un- happiness
S 372	Belonging to many vs. few societies	.29	.13	— .03	.32	.24	H
S 373	Few intimate friends vs. many acquaintances	.16	— .16	— .13	.32	.305	H
S 377	Liking jealous people vs. liking conceited people	.30	.04	— .02	.32	.29	H
S 385	Usually liven up the group on a dull day	.15	— .20	— .22	.37	.36	H
S 386	Am quite sure of myself	.30	.01	— .16	.46	.375	H
S 387	Accept just criticism without getting sore	— .26	— .05	.53	.79	.50	U
S 400	Plan my work in detail	.24	.11	— .11	.35	.24	H
S 402	Put drive into the organization	— .09	.02	.15	.24	.175	U
S 412	Loan money to ac- quaintances	.30	— .10	— .10	.40	.40	H

It is known, however, that this is considerably larger than the probable error of the Pearson  $r$ .

It will be noted that Table 19 gives the largest divergence of L or D group from the H group, and also the average of the L and D divergences. The average divergence is the best single indication of the value of the item, although similarity of L and D divergence is also desirable. In the last column of the table H indicates that husband-wife agreement in response tends to be associated with marital happiness, U that it tends to be associated with marital unhappiness or divorce (or both).

Table 19 presents an interesting contrast to the data on total scores in the fact that so many of the individual items are associated significantly with marital compatibility. The extreme L or D divergence from the H correlation is 50 or higher for 22 of the items, and 40 or more for 78 items. Even the average of the L and D divergences is 40 or more for 15 items, and 30 or more for 56 of them. The probabilities are appreciably against an L-D average divergence of 30 or more being due to chance. Average L-D divergence in

the range of 20 to 30 carries at least a suggestion of validity for an item if the L and D coefficients are consistent.

The reader will doubtless find many surprises in Table 19 both with respect to degree of association with happiness and the direction (i.e., whether spouse agreement is favorable or unfavorable). Consider first the items showing the greatest degree of association. The highest ranking item is B 50, *re* avoiding arguments. It appears that among the 545 items the greatest single danger to marital happiness is for one spouse to like and the other to dislike to argue. This sounds reasonable enough, but why the second highest item should be interest in the occupation of life insurance salesman is somewhat baffling, unless the explanation lies in the particular type of social extroversion which this kind of salesmanship requires. It is reasonable that agreement on preference between attending a play and attending a dance (B 98) should be associated with marital compatibility, for the preference doubtless connotes a good deal with respect to one's total personality. Similarly whether one would like or dislike teaching adults (S 212) might very well token a great deal for one's personality and interests. The choice between the work of street-car conductor and street-car motorman (S 339) probably hinges on the relative interest in people and in mechanical things, and likeness between spouses on this point could easily be conducive to happiness. The same could be said for preference between variety and sameness of work (S 362). It is notorious that interest in the opposite sex (B 124) frequently brings marital complications when one spouse has it and the other does not. Why S 29, interest in the occupation of dentist, or S 296, like or dislike of men who use perfume, should give the results they do we are unable to say. Two items yielding large differences such that agreement of spouses is negatively related to happiness are interest in the occupation of librarian (S 53) and ability to accept criticism (S 387). The typical librarian probably tends to be more than ordinarily bookish, seclusive, and non-social, traits in which mating of likes could conceivably be less favorable to happiness than mating of unlikes. We are not able to suggest a plausible explanation of the fact that spouse agreement on ability or inability to accept criticism without getting "sore" (S 387) should be unfavorable to happiness; one might perhaps even have expected the reverse. Whatever the reason, the evidence is



strong that for one spouse to be able to accept criticism when the other cannot is more favorable than agreement.

It seems reasonable that spouse agreement should be favorable (or disagreement unfavorable) on such items as wanting attention when ill (B 70), willingness to take a chance alone (B 82), liking for pet canaries (S 136), liking for regular hours (S 234), active interest in charities (S 240), interest in looking at antique furniture (S 245), attitude toward teetotalers (S 293) (disagreement a fertile source of discord), or lending money to acquaintances (S 412). We leave it to the reader to explain why it is unfavorable for spouses to disagree on their liking for Pershing (S 325) and on their tolerance for pessimists (S 253). Agreement is unfavorable on crossing the street to avoid meeting someone (B 4). Response to this item may be influenced by a tendency to harbor personal dislikes, the presence of which in both spouses would be likely to breed trouble. Why agreement of spouses on interest in landscape gardening (S 50) should also be unfavorable is not clear, unless this interest is associated with what is commonly called the "artistic temperament" and its traditional restiveness under the yoke of marriage.

There are a few puzzling disagreements between items that appear to be closely similar. For example, B 17, on being much affected by the praise or blame of many people, would seem to be much like B 102, working better when praised. However, agreement on the latter is favorable to happiness and agreement on the former unfavorable. Similarly with S 412 on loaning money to friends, and B 55 on being thrifty and careful in making loans; with the former agreement is favorable and with the latter unfavorable. However, these two items are not so nearly identical as they appear to be, for one may be thrifty and careful in making loans and yet at times make them. Even so, it is not easy to see why likeness between spouses in regard to care and thriftiness in making loans should be associated with unhappiness. Again it seems strange that spouse agreement should be unfavorable on "irreligious people" (S 263), when it was favorable in the case of S 293, "teetotalers."

Other items on which spouse likeness is unfavorable are B 60, rewriting letters (perhaps indicating indecision or over-scrupulosity); B 104, alternation of feelings without cause (heavily weighted by its author for neurotic tendency); B 123, discipline causing discontent (indocility or rebellious attitude); S 86, "secret service man"

(sleuthing interest); and S 66, "orchestra conductor" (artistic temperament).

We forego further speculation as to possible interpretations of the husband-wife correlations on the individual test items until these items have been submitted to new and much larger groups and the correlations have been confirmed. Items whose validity can not be substantiated will have to be discarded, however plausible they may seem, and those which stand the test of repeated trial will have to be retained whether we can explain their behavior or not.

Table 19 offers valuable evidence of the merits of the data in the fact that the L and D divergences from the H group are usually in the same direction. Taking the absolute figures as they stand, the direction is the same for 78 of the 130 items; if we ignore directional differences of 10 or less, the direction is the "same" for 96 items. One could not assume that the direction of divergence would be the same for every item, even if the data were perfectly reliable and valid; there are no doubt genuine psychological differences between L and D groups which would prevent this. However, in view of the known similarities of such groups it speaks well for the data that the found correlations agree on the whole so well.

Before closing this section it will be well to remind the reader that here as elsewhere in this study one must guard against taking the fact of association of a given datum with marital happiness as proof of a causal relationship, or of the direction of causal relationship if such exists. In the case of many of the items it seems reasonable to believe that high correlation between husband and wife responses in the H group is the result rather than the cause of the happiness; spouses who are happily mated may develop similarity of likes, dislikes, and attitudes simply because they *are* happy. Conversely, two spouses may find themselves unhappy in their marriage for any one of a hundred very special or even trivial reasons, and, being unhappy, may each tend to develop likes, dislikes, and attitudes that are antagonistic to those possessed by the other.

#### TRAIT CHARACTERISTICS OF THE H, L, AND D GROUPS AS INDICATED BY MEAN SCORES IN THE PERSONALITY TESTS

Do the happily married tend to differ from the unhappily married or divorced groups of the same sex in the personality traits represented in our thirteen variables? Perhaps most people would expect

to find certain differences, as, for example, that the happily married would tend to be less "neurotic," less "introverted," more mature in their interests, and more interested in social-service and "uplift" activities. Some would expect the H women to be less masculine-minded than the L or D, and the D women to be more "self-sufficient" than the L or H. There is one circumstance, however, which tends to reduce the expected differences—the fact that a subject's marital happiness is in part a function of the spouse's personality.

The means of our six groups on the thirteen variables are given in Table 20. The scores in question are z-scores derived separately for the men and women. They accordingly do not reveal sex dif-

TABLE 20  
MEAN Z-SCORES OF H, L, AND D GROUPS IN THE THIRTEEN VARIABLES  
(100 of each sex in each group)

	Husbands			Wives		
	H	L	D	H	L	D
C.P.A.	5.31	4.82	5.09	5.00	4.90	5.27
$\sigma_M$	.19	.20	.18	.20	.21	.21
Chemist	4.88	4.79	4.67	5.16	4.63	5.37
$\sigma_M$	.20	.20	.20	.20	.20	.20
Lawyer	5.23	4.93	5.27	5.22	5.01	5.29
$\sigma_M$	.23	.20	.21	.20	.19	.22
Life insurance salesman	5.11	5.16	5.40	5.00	4.97	4.51
$\sigma_M$	.18	.17	.19	.18	.18	.19
Teacher	5.18	4.61	4.10	5.21	5.01	4.30
$\sigma_M$	.18	.21	.20	.19	.21	.19
Y.M.C.A. worker	5.03	4.83	4.39	5.08	5.04	4.40
$\sigma_M$	.21	.21	.19	.21	.20	.20
Office clerk	5.01	4.97	4.65	4.99	4.96	4.42
$\sigma_M$	.21	.21	.22	.20	.20	.23
Interest maturity	5.46	4.71	4.96	5.39	4.95	5.03
$\sigma_M$	.20	.20	.18	.17	.19	.18
Masculinity-femininity	4.67	5.14	4.29	4.71	4.56	5.45
$\sigma_M$	.20	.19	.18	.24	.21	.20
B1-N	4.70	5.39	5.40	4.66	5.33	4.64
$\sigma_M$	.19	.21	.18	.21	.21	.20
B2-S	4.88	4.98	4.95	4.63	4.86	5.79
$\sigma_M$	.20	.21	.20	.19	.21	.21
B3-I	4.67	5.39	5.57	4.66	5.25	4.95
$\sigma_M$	.18	.20	.19	.20	.20	.20
B4-D	5.13	4.79	4.99	5.17	4.81	5.42
$\sigma_M$	.19	.20	.18	.21	.21	.21

ferences but do make possible inter-comparisons among the three groups of each sex.

In Table 21, which gives the critical ratios of the differences

TABLE 21

CRITICAL RATIOS OF THE DIFFERENCES BETWEEN THE MEANS GIVEN IN TABLE 20

	Husbands			Wives		
	H—L	H—D	L—D	H—L	H—D	L—D
C.P.A.	+1.78	+0.84	—1.00	+0.35	—0.95	—1.27
Chemist	+0.32	+0.76	+0.43	+1.90	—0.75	—2.67
Lawyer	+0.99	—0.13	—1.18	+0.76	—0.23	—0.95
Life insurance salesman	—0.20	—1.13	—0.95	+0.12	+1.83	+1.74
Teacher	+2.03	+4.00	+1.76	+0.71	+3.38	+2.53
Y.M.C.A. worker	+0.68	+2.28	+1.20	+0.14	+2.34	+2.25
Office clerk	+0.13	+1.19	+1.06	+0.10	+1.86	+1.77
Interest maturity	+2.93	+1.84	—0.92	+1.74	+1.44	—0.30
Mental masculinity	—1.67	+1.41	+3.24	+0.47	—2.39	—3.08
B1-N	—2.47	—2.70	—0.04	—2.26	+0.07	+2.36
B2-S	—0.34	—0.25	+0.10	—0.81	—4.16	—3.14
B3-I	—2.66	—3.45	—0.66	—2.08	—1.01	+1.05
B4-D	+1.24	+0.53	—0.76	+1.21	—0.85	—2.07

recorded in Table 20, a plus sign means a higher mean score for the first member of the pair concerned, a minus sign a lower score. In each case the pairs concerned are indicated in the column heading. Critical ratios of 2.00 or more are in italics.

The scarcity of large differences between like-sex groups is such as to offer little support for the belief that the happily married individual is typically different from the L or D individual of the same sex in the majority of personality traits measured by the tests used. Some of the differences, however, are significant and interesting. Let us scrutinize these differences with reference to their plausibility, taking them in the order given in the tables.

1. *Certified Public Accountant.* No significant difference, although H husbands tend to have slightly more of this type of interest than L husbands (CR 1.78).

2. *Chemist.* No significant difference for men. Among the women, however, the L group is markedly below the D group (CR 2.67) and probably below the H group (CR 1.90).

3. *Lawyer*. No significant difference.

4. *Life Insurance Salesman*. There is a suggestion that H and L women have more of this type of interest than the D (CR's 1.83 and 1.74, respectively).

5. *Teacher*. Marked differences in the case of both sexes. The H men have significantly more of this type of interest than either the L or D (CR's 2.03 and 4.00, respectively), and the L probably more than the D (CR 1.76). Among the women, both H and L groups rate markedly above the D (CR's 3.38 and 2.53).

6. *Y. M. C. A. Worker*. The differences here are in line with those for teacher, although somewhat smaller. H men have more of this interest than D men (CR 2.28), and both H and L women have more than the D (CR's 2.34 and 2.25).

7. *Office Clerk*. No clearly significant differences, although a tendency is noticeable for both H and L women to have more of this type of interest than D women (CR's 1.86 and 1.77).

8. *Interest Maturity*. H men rate markedly higher than L (CR 2.93) and probably higher than D (CR 1.84). H women tend to rate somewhat higher than either the L or D (CR's 1.74 and 1.44).

9. *Mental Masculinity*. The outstanding difference among men is the markedly high rating of the L group as compared to the D (CR 3.24), the H group being about half way between the two. For the women the outstanding fact is the lower masculinity of the H as compared with either the L or D (CR's 2.39 and 3.08).

10. *B1-N, "Neurotic Tendency."* The H men are distinctly less "neurotic" as a group than the L (CR 2.47) and than the D (CR 2.70). The L women are the most "neurotic," being separated from the H by a CR of 2.26 and from the D by a CR of 2.36, the means of the H and D being almost identical.

11. *B2-S, "Self Sufficiency."* We find here no significant differences for the men, but large differences for the women. Among women the striking fact is the high "self sufficiency" of the D group, which exceeds the H group by a CR of 4.16 and the L group by a CR of 3.14.

12. *B3-I, "Introversion."* As would be expected from the close correlation between B1-N and B3-I, the critical ratios agree closely with those already given for "neurotic tendency." The H men are "less introverted" than the L (CR 2.66) and than the D (CR 3.45).



H women are less "introverted" than the L (CR 2.08) and a trifle less than the D (CR 1.01).

13. *B4-D, "Dominance."* Only one difference is very significant; L women are less "dominant" than the D (CR 2.07).

One of the most striking facts in Table 21 is that whereas H men differ from the L and D in much the same way, this is not true of the women. That is, L and D men are much alike, differing significantly from one another only in mental masculinity (the low being considerably more masculine). Among the women, however, the L and D groups present the greatest contrast. In fact, L and D women are much less alike than the H and L women. Putting it in another way, it is the D woman who stands out from the other female groups, and the H man who stands out from the other male groups.

Compared with L or D men, H men have more uplift interests, greater interest maturity, and are less "neurotic" (or "introverted"). In M-F score they are about midway between the more masculine-minded L group and the more feminine-minded D group.

The H women differ significantly from the L women only in being less "neurotic" (or "introverted"), although there is strong suggestion that their interests are more mature and more like those of workers in the physical sciences. As compared with D women, H women are much less "self sufficient," less masculine-minded, and far more interested in uplift activities. Their moderate excess of score over D for the occupation of office clerk suggests greater docility and greater interest in routine; their higher score for the occupation of life insurance salesman is probably connected with their greater social and uplift interests.

D women differ from L women in all the ways in which they differ from the H, and to much the same degree. In addition, they differ from the L in being more "dominant," less "neurotic," and more interested in science.

### SUMMARY

The Bernreuter Personality Inventory and the Strong Vocational Interest Test were administered to 345 married couples and to 116 divorced couples. The married couples supplied anonymous data which yielded marital happiness ratings. The two tests were scored

for thirteen variables, including seven characteristic types of vocational interest, and "interest maturity," "masculinity-femininity," neurotic tendency, "self sufficiency," "introversion," and "dominance." A comparative study was made of the 100 most happily married couples, the 100 least happily married couples, and 100 divorced couples with respect to mean scores in the thirteen variables, degree of husband-wife resemblance in the variables, and the direction of husband-wife differences. All of these comparisons based upon total scores showed low or negligible correlations with marital happiness. However, statistical treatment of the responses of the subjects to the 545 items of the tests showed that more than a quarter of the items taken singly appear to have appreciable validity as indicators of marital compatibility. These items and others suggested by them will be tried out further with larger populations. Incidentally no correlation was found between marital happiness and age at marriage, age difference between spouses, number of offspring, or spouse-parent attachments and conflicts.

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#### LES FACTEURS DE PERSONNALITÉ DANS LA COMPATIBILITÉ MARITALE

(Résumé)

On a fait subir l'Inventaire de Personnalité Bernreuter et le Test de l'Intérêt Professionnel Strong à 345 couples d'époux et à 116 couples divorcés. Les couples d'époux ont fourni des données anonymes qui ont cédé des évaluations du bonheur marital. On a mis les deux tests en échelle pour treize variables, y compris sept types caractéristiques de l'intérêt professionnel, et "la maturité de l'intérêt," "la masculinité-fémininité," "la tendance à la névrose," "la suffisance," "l'introversion," et "la dominance." On a fait une étude comparative des 100 couples d'époux les plus heureux, des 100 couples d'époux les moins heureux, et de 100 couples divorcés à l'égard des résultats moyens des treize variables, du degré de ressemblance entre le mari et la femme dans les variables, et de la direction des différences

entre le mari et la femme. Toute ces comparaisons basées sur les résultats totaux ont montré des corrélations peu élevées ou négligeables avec le bonheur marital. Cependant, le traitement statistique des réponses des sujets aux 545 points des tests a montré que plus que le quart des points pris individuellement semble avoir une valeur appréciable comme indicateur de la compatibilité maritale. On fera subir ces points et d'autres qu'ils suggèrent à plus de sujets. A propos, on n'a trouvé aucune corrélation entre le bonheur marital et l'âge au mariage, la différence entre les âges des époux, le nombre des enfant, ou les attachments et les conflits entre époux et parent.

TERMAN ET BUTTENWIESER

## PERSÖNLICHKEITSAKTOREN BEI DER EHELICHEN VERTRÄGLICHKEIT

(Referat)

Das Bernreuter Persönlichkeitsinventar und der Strong Berufseignungstest wurden 345 Ehepaaren und 116 geschiedenen Paaren gegeben. Die Ehepaare lieferten namenlose Angaben, woraus Auskünfte über das Eheglück gesammelt wurden. Die Zwei Tests wurden auf Grund drei Variablen verwertet, welche sieben charakteristische Arten von Berufsinteressen, "Interessenreife," "Männlichkeit-Weiblichkeit," "neurotischer Neigung," "Selbstständigkeit," "Introversion," und "Herrschaftsucht" einschlossen. Ein vergleichendes Studium der 100 glücklichsten Ehepaare, der 100 am wenigsten glücklichen Ehepaare, und 100 geschiedener Paare in bezug auf die Durchschnittswerte der dreizehn Variablen, den Grad der Mann-Frauähnlichkeit der Variablen, und die Richtung der Mann-Frauunterschiede wurde gemacht. Alle diese Vergleiche zeigten niedrige oder unbedeutende Korrelationen mit Eheglück. Die statistische Behandlung der Angaben der Vpn. über die 545 Einzelheiten des Tests bewies aber, dass mehr als ein Viertel der Einzelheiten, einzeln genommen, eine beträchtliche Gültigkeit als Merkmale der ehelichen Verträglichkeit zu besitzen scheint. Diese Einzelheiten und andere, die durch diese entstanden sind, werden später bei einer grösseren Gruppe weiter ausgeführt. Nebenbei fand sich keine Korrelation zwischen Eheglück und dem Alter zur Zeit der Heirat, dem Altersunterschied zwischen den Eheleuten, der Anzahl der Nachkommenschaft, oder den Gatten-Elternbeziehungen und Konflikten.

TERMAN UND BUTTENWIESER

# GENERAL VERSUS SPECIFIC COLOR PREFERENCES OF CHINESE STUDENTS\*

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## I. INTRODUCTION

Garth (5) has recently reviewed the literature on racial differences in color preference. The color-preference scales of only six races were reported in the past, namely, Whites, Negros, Indians, Filipinos, Japanese, and Mexicans. It would be interesting to know what the Chinese color-preference scale would be in comparison with that of each of the above six races. Some meager data were obtained in the past by one or two Chinese investigators. Chen (2), for example, had tested seventy-five Chinese school children. However, the results obtained were questionable because he himself was aware of the fact that the number of subjects was small, the size of the color paper used was irregular, and the procedure was not well controlled.

Beside furnishing some comparative racial data in general, the special Chinese color-preference test described below aims to find in particular whether color preference as such is a function of the color object. In other words, the writers of this paper wish to investigate whether color preference is absolute or relative. Is there a general, absolute color preference in and by itself, or is it specific and relative? If both general and specific color preferences do exist, what is the relation between them? The purposes of this paper may be stated briefly as follows:

1. To determine the color-preference scale of Chinese Middle School and College students for a tentative group comparison with that of other races.
2. To see whether color preference is a function of the colored object, i.e., whether general and specific color preferences exist.
3. To find, if general and specific color preferences do exist,

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whether there is any positive correlation between them; if so, how much.

4. To compare the degree and nature of general preferences of Chinese for pure color words with those for the actual colors of objects.

5. To bring out the distinction between color discrimination, color preference, and color association and especially to point out the possible relation between the latter two.

## II. THE COLOR-PREFERENCE TEST

In the summer of 1932, a special paper-pencil color-preference test was devised especially for the testing of Chinese subjects. It is a four-page test similar to any standard paper-pencil test. It may be used both as an individual and as a group test. Part I is a test of preference for color words and Part II a test of preference for colors of objects. On the first page, blanks for subject's name, sex, age, and school grade or vocation are provided. As for age and vocation, the new method of underlining one of the printed age groups and the listed words denoting grade standing or vocation was adopted so that later statistical treatment may be much facilitated. The time required to finish the two parts of the test is about twenty minutes.

*Test of Absolute, General Preference for Color Words.* Part I of the test was devised for testing the alleged absolute, general preference for pure colors. Color words instead of actual color papers were used, because Michaels (8) had previously found that color words are just as good as actual colors.<sup>1</sup> Besides, the use of color words has several advantages over color light, color paper, or color object, which had all been used by past investigators. First, color words are ever-ready and less expensive; second, it avoids the fatigue or adaptation effect as noticed by Norris, Twiss, and Washburn (9); and last, the color-contrast effect may be entirely avoided.

The method of paired comparison extensively used by Thurstone in the measurement of social attitude (13) is employed in this Part I of the test. Nine color words are used, namely, Red, Orange, Yellow, Green, Blue, Violet, White, Gray, and Black, and hence

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<sup>1</sup>Our result contradicts Michael's finding. See below.



there are thirty-six pairs of color words to be compared. The order of presentation of the thirty-six pairs is determined by chance. The subject is instructed to compare each of the listed pairs of color words pair by pair and from the first to the last without exception. He is also instructed to cross out one and only one color word that he prefers in the pair. The complete instructions are translated as follows:

Mr. Chang likes red color, Mr. Li likes blue color, and Mr. Ma likes green color. What color do you like? Please compare the following pairs of colors. First take pair No. 1, see whether you like the first of the pair or the second of the pair, and then cancel that one you like better. For example: in the pair "Green—Blue," where you cancel the word "Blue," you mean to say that you like Blue better than Green. Even if you like equally well both colors of any one pair, you still have to choose one anyway. Start with pairs No. 1, 2, 3 until you reach pairs No. 35, 36; please follow the exact order of the different pairs, compare the two colors in every pair and cancel that one you like better. But in each pair cancel only one of the two color words.

*Test of Relative, Specific Preference for Colors of Objects.* Part II of the test was devised for testing the relative, specific color preferences of different objects. Forty-two object names were chosen, representing seven groups of everyday articles. Each group had six representative objects, of which one is the general object and the other five the specific ones. The selection of these forty-two objects was based on two criteria: (1) the objects must be comparatively familiar to school students as well as to the common people; and (2) the objects must have a wide variety of actual colors.

On each of the forty-two object names a preference question is asked, so as to force the subject to prefer either actually or hypothetically one and only one color for that particular object. Before each question nine color names are printed. If he prefers a certain color for any one object asked in a certain question, he just cancels that color word before that question. The following are three sample questions about three objects:

R O Y G B V W Gy Bk 2. What color of clothes do you like to wear most?

R O Y G B V W Gy Bk 4. What color of furniture do you like to have most?

R O Y G B V W Gy Bk 5. What color of flowers do you like most?

The names of the forty-two objects are listed in Table 1, where

TABLE 1

GENERAL AND SPECIFIC OBJECTS FOR WHICH COLOR PREFERENCES ARE SOUGHT

Classes	Order	Names of different objects
A	1	<i>House</i>
A1	8	House-top
A2	15	Wall
A3	22	Ceiling
A4	29	Floor
A5	36	Window and door
B	2	<i>Dress</i>
B1	9	Western Dress
B2	16	Chinese gown
B3	23	Winter over coat
B4	30	Chinese long gown (woman)
B5	37	Rain coat
C	3	<i>Decoration</i>
C1	10	Necktie
C2	17	Hat
C3	24	Shawl
C4	31	Glove
C5	38	Socks and stockings
D	4	<i>Furniture</i>
D1	11	Bed
D2	18	Sofa
D3	25	Table and chair
D4	32	Cabinet
D5	39	Tea-table
E	5	<i>Flowers</i>
E1	12	Chrysanthemum
E2	19	Peony
E3	26	Chinese water chestnut
E4	33	Balsam
E5	40	Plum flower
F	6	<i>Interior decoration</i>
F1	13	Carpet
F2	20	Vase
F3	27	Curtain
F4	34	Lamp shade
F5	41	Bed cover
G	7	<i>Stationery</i>
G1	14	Book-cover
G2	21	Chinese letter paper
G3	28	Fountain pen
G4	35	Picture frame
G5	42	Eraser

the capitals A, B, C, . . . represent groups of general objects, while the figures 1, 2, 3, . . . following them denote specific objects within that general group. The seven groups of forty-two questions appear in systematic alternation, i.e., the seven general objects appear first, then each set of the seven specific objects follows in alternation. Preliminary trials made us believe that this systematic sequence had little effect upon the preference of the subject, because he never knew the classification beforehand, nor was aware of the existence of general and specific objects. He was simply to read the following instructions (translation) before those forty-two test questions:

Mr. Chang likes red flowers, yellow lamp-shade, and blue gloves. Is your color preference different for different objects? Please read the following questions, determine which color you like most for that particular object asked in each question, and then cancel that color word before that question. For example, in the question: "R O Y G B V W Gy Bk 12. What color of chrysanthemum do you like most?", where you cancel the word Y, you mean to say that you like yellow chrysanthemum most. Answer every one of the forty-two questions and answer them in the same order as printed. Even if there are several colors that you like equally well for any particular object, you have to choose one you like comparatively the best. If any object happens to have no one definite color, then think for a while what are its principal colors, and then choose that one for that object. For each question cancel one and only one color word. If you are not in possession of the object asked in any question, then supposing you are going to have or buy it, answer what color you would prefer most.

*Subject and Procedure.* Results reported in this paper were obtained from one group of 110 college freshmen in a chemistry class in Tsing Hua University and two groups of 442 Middle School students in the city of Peiping, both of them being well-known private schools, one of long standing supported by missionaries and the other recently organized by popular donations. Of the total number of 552 subjects tested, 230 or 79% from all six grades of the Chinese private school and 127 or 84% from only the third year of the missionary school yielded satisfactory returns of the test blanks for statistical analysis, while 94 or 85% of the college

freshmen answered the test satisfactorily for treatment. It is perhaps significant to note, as we will see later, that the Chinese private school was specially established for students who were driven out of Manchuria by Japanese occupation. The ages of the three groups of students ranged from 12 to 25 years. Only 45 out of the 451 students whose results are treated were girls; the rest are all boys.

The testing of the two Middle School groups was conducted on the morning of December 15th, 1932 by the senior author Siegen K. Chou, assisted by Mr. H. P. Chen and a Junior psychology student Miss Laura Chao, and the College group on the morning of September 30th, 1933, with a number of other assistants. The 127 missionary students were tested in one group in a big, well-lighted lecture hall, but the 230 students of the other private school were tested in several groups as determined by the classes of the several grades. The college group was tested without prior notice. Actual color disks,  $4\frac{1}{2}$  inches in diameter, corresponding to the different color words were shown, at the beginning of the test, to the Middle School students, but not to the college group, so that they might recall what actual colors the color words represent when answering the test.

*Methodology.* A thorough review of past literature on the subject of color preference reveals the fact that at least three factors are operative in the general problem of the aesthetics of color, namely, discrimination, association, and preference. Although Preyer (12) and Garbini (11) reported results from very young children by the *naming method*, their scale or order of colors can hardly be taken as a scale of preference. It is rather a scale of *discrimination*, which simply means that the child names correctly a certain color much more frequently than others. Whether correct naming, even free of chance factors, is a direct measure of preference for that color is a doubtful question. It is even more doubtful when we take the number of specific movements in response to different colored lights as the indication of preference. Although this genetic interest in the congenital behavior of infants toward colored stimuli led to later extensive investigations on the problem of color preference, the entirely discriminative aspects need not be confused with color preference as such.

Furthermore, we need to clarify the concept of color preference

by noting the fact that it is perhaps closely related to, if not an equivalent of, *color association*. Dorcus (4), who reviewed most literature on the subject, doubted that there is such a thing as *color preference*. In the first place, "the number of individuals, in a particular group, who prefer a given color to all the other colors is no greater than the number of individuals in that group who are unable to decide upon a given color." In the second place, "there is a very high percentage of reversals of choice on a second presentation and the determination of the order of preference is based, in most cases, on a figure which represents a preference in a little more than 50% of the presentations." In the third place, "in total number, the subjects give more associative words to the saturated series than to the unsaturated series." Both Mrs. Stanley Hall (11) and Preyer (11) noticed long ago that a child may associate different colors with concrete objects of daily life, e.g., to call everything black "Kitty" because a black cat was so named. If such be the case, then our preference for any particular color means simply that we had in our past experience abundant pleasant associations for that color, so that whenever we meet that color or color word, we endorse it as more or less preferable because we can associate more or less abundant pleasant associations with that particular color.

Several methods were used in the past for determining a color-preference scale. Baldwin's *acceptance and rejection method* (1) is too subject to chance error. The *method of serial presentation* suffers from contrast effect if actual colors are employed. The *choice or ranking method* employed by Luckiesh, Jastrow, Dashiell, and Garth (4) seems to be also crude. The *paired comparison method* is relatively accurate, especially when Thurstone's elaborate procedure is employed.

### III. A CHINESE COLOR-PREFERENCE SCALE

Thurstone's statistical procedure in the method of paired comparisons was followed throughout in the treatment of our data. Table 2 shows the *experimental proportions* of the entire group of 451 boys and girls, which may be read, e.g., as 48.3% of the 451 boys and girls preferred Orange in comparison with Red, 48.1% preferred Yellow in comparison with Red. The sums of all the ex-



TABLE 2

EXPERIMENTAL PROPORTIONS OF 451 CHINESE BOYS AND GIRLS TOWARD NINE COLOR WORDS

	R	O	Y	G	B	V	W	Gy	BK
Red		.483	.481	.477	.576	.412	.647	.310	.472
Orange	.517		.525	.545	.661	.426	.672	.395	.497
Yellow	.519	.475		.534	.614	.430	.621	.339	.481
Green	.523	.455	.466		.643	.395	.707	.368	.466
Blue	.424	.339	.386	.357		.284	.548	.271	.370
Violet	.588	.574	.570	.605	.716		.754	.424	.550
White	.353	.328	.379	.293	.452	.246		.220	.282
Gray	.690	.605	.661	.632	.729	.576	.780		.676
Black	.528	.503	.519	.534	.630	.450	.718	.324	
$\Sigma p$	4.142	3.762	3.987	3.977	5.021	3.219	5.447	2.651	3.794
Rank	3	7	4	5	2	8	1	9	6

perimental proportions under each column were noted in the  $\Sigma p$  row, from the relative size of which the rank orders of the different colors were obtained in the last row of the tables. This rank order already indicates roughly the order of preference of these 451 boys and girls for the nine color words (Chinese characters). Thurstone's technique enables us, however, to determine exactly the relative separation of the different colors along a lineal scale of uniform units.

For this purpose, the sigma values were next obtained directly from the Kelley-Wood Table (6) for each of the experimental proportions as shown in Table 3, the sigma values being positive if their corresponding experimental proportions are greater than 50%. The algebraic sum of all the sigma values (T) in each column were entered in the bottom row. Having both the experimental propor-

TABLE 3  
SIGMA VALUES CORRESPONDING TO TABLE 2

	R	O	Y	G	B	V	W	Gy	BK
R		-.043	-.048	-.058	+.192	-.222	+.377	-.496	-.070
O	+.043		+.063	+.113	+.415	-.187	+.445	-.266	-.008
Y	+.048	-.063		+.085	+.290	-.176	+.308	-.415	-.048
G	+.058	-.113	-.085		+.367	-.266	+.545	-.337	-.085
B	-.192	-.415	-.290	-.367		-.571	+.121	-.610	-.332
V	+.222	+.187	+.176	+.266	+.571		+.637	-.192	+.126
W	-.377	-.445	-.308	-.545	-.121	-.687		-.772	-.577
Gy	+.496	+.266	+.415	+.337	+.610	+.192	+.772		+.457
Bk	+.070	+.008	+.048	+.085	+.332	-.126	+.577	-.457	
T.	-.368	-.618	-.029	-.084	-2.656	-2.043	-3.832	-3.545	-.537

tions and their respective sigma values, the scale separations were then calculated according to the following formula:

$$S_1 - S_2 = \frac{\sqrt{2}}{N} (X_{1K} - X_{2K}), \text{ where}$$

$S_1 - S_2$  represents the scale separation between any two given colors 1 and 2,

$N$  is the number of colors to be compared,

$X_{1K}$ ,  $X_{2K}$  are the sigma values of the two given colors 1 and 2 in comparison with any third constant color  $K$ .

A sample calculation of the scale separation between the two highest rank colors White and Blue is shown in Table 4. The first

TABLE 4  
SAMPLE CALCULATION OF SCALE VALUES

	White .....	1	
	Blue .....	2	
	$X_{1K}$	$X_{2K}$	$X_{1K} - X_{2K}$
Red	.377	.192	.185
Orange	.445	.415	.030
Yellow	.308	.290	.018
Green	.545	.367	.178
Blue	.121	.000	.121
Violet	.687	.571	.116
White	.000	-.121	.121
Gray	.772	.610	.162
Black	.577	.332	.245
Total	3.832	2.656	1.176

$$\begin{aligned}
 S_1 - S_2 &= \frac{\sqrt{2}}{N} (X_{1K} - X_{2K}) \\
 &= \frac{\sqrt{2}}{9} (1.176) \\
 &= .1848
 \end{aligned}$$

column,  $X_{1K}$ , records all the sigma values between White (1) and Red, Orange, Yellow, etc. ( $K$ 's), the second column,  $X_{2K}$ , between Blue (2) and Red, Orange, Yellow, etc. (also  $K$ 's), and the third column the differences between the first two columns. The scale separation between White and Blue was found to be .1848. Eight tables similar to Table 4 were made in order to obtain all the scale

separations from the highest rank colors to the lowest rank ones as shown in Table 5. Using the least preferred color Gray as an origin, then the final scale values were calculated as shown in Table 6. This scale tells us not only the qualitative order of preference

TABLE 5  
SCALE SEPARATIONS

White .....	Blue	.1848
Blue .....	Red	.3595
Red .....	Yellow	.0624
Yellow .....	Green	.0086
Green .....	Black	.0712
Black .....	Orange	.0127
Orange .....	Violet	.2139
Violet .....	Gray	.2360

TABLE 6  
SCALE VALUES

White	1.1491
Blue	.9643
Red	.6048
Yellow	.5424
Green	.5338
Black	.4626
Orange	.4499
Violet	.2360
Gray	.0000

but also the quantitative separation of relative degrees of preference for the nine colors, which may be best seen from the graphic scale in Figure 1.

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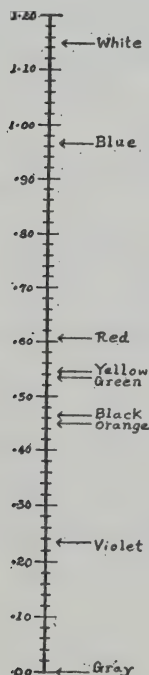


Fig. 1 A Chinese Color Preference Scale

It is evident from the graphic scale that the order of preference for the nine colors arranged from the most preferred on the top to the least preferred at the bottom is: White, Blue, Red, Yellow, Green, Black, Orange, Violet, and Gray. Since the lineal distance represents scale separation, we at once know that the degree of preference for the nine colors is different for different colors. White is widely separated from Blue, which is again even still more widely separated from Red. Although Red, Yellow, Green, Black, and Orange are close together, wide separations appear among Orange, Violet, and Gray. In other words, our subjects have distinct preferences for White, Blue, and Red and distinct non-preferences for Black, Orange, Violet, and Gray, while Red, Yellow, Green, Black, and Orange, lying in the middle, are least discriminated as to their preferential order among the nine colors. This fact tells us also that extremely preferred and non-preferred colors are better discriminated, while the indifferent ones are much more poorly discriminated. This confirms Garth's contention (5) that the closer the difference in scale value between colors approaches a value of zero, the greater the confusion with reference to those two colors. This relation between discrimination and preference is perhaps significant.

*Comparison with Other Races.* According to Garth (5), four of the six total racial groups, namely, Whites, Negroes, Indians, and Japanese (except Filipinos and Mexicans), preferred White and Yellow least (Figure 2). On the other hand, our Chinese

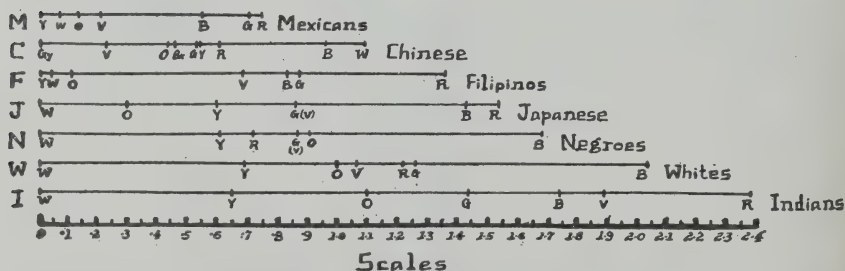


Fig. 2 Color Preference Scales for Different Racial Groups

subjects show a decided preference for White and Blue. It had been repeatedly demonstrated by past investigators that there is no intrinsic native racial difference in color preference as such, because the color-preference reactions of the young of all races are strikingly

similar, although some racial difference has been found in adult subjects. Now how are we going to explain this seemingly striking difference between Chinese and other races?

Difference in method and material is perhaps partly responsible for these differences. (1) Thurstone's procedure of the method of paired comparisons is a more refined technique than any procedure used in the past. If the differences found are due to our method, then our present result must be more reliable. (2) Although color words had been used by past investigators and Michaels (8) had found that they are just as good as actual colors, the difference in language might perhaps account for some discrepancies. The subjects responded to color words in Chinese characters, many of which do not exclusively stand for colors.

*Why Chinese Students Prefer White and Blue.* Garth (5) had ably demonstrated that racial difference in color preference in the adult is due to nurture, national tradition, folk usage, and formal education. In this connection, we perhaps see the important relation of habitual color association to the matter of color preference. [Preyer (11), Hall (11), Ellis (4), and Martin (7)]. This is especially evident in our case. The fact that our Chinese subjects preferred White and Blue rather than Red or Green or Yellow can only be explained by habit, tradition, and education. The following interpretations are at least possible.

*a. Association influence.* Ouyang (10) and J. Y. Chen (3) had counted the frequency of various color words contained in numerous Chinese poems and prose. The frequencies of appearance in Chinese literature of our nine colors are shown in Table 7.

TABLE 7  
FREQUENCY OF COLOR WORDS CITED IN CHINESE POEMS AND PROSE

	R	O	Y	G	B	V	W	Gy	Bk
Ouyang	48	1	18	40	19	7	37	1	25
Chen	35	0	33	33	32	25	67	0	38
Total	83	1	51	73	51	32	104	1	63
Rank	2	8½	5½	3	5½	7	1	8½	4

The most frequently used color word in Chinese literature is the character for White, which has a total score of 104, the least frequent ones being Orange and Gray. The correlation coefficient (by Spearman rank method) between this actual frequency rank and our preference rank is  $+.78$ . White and Red being the color words



frequently met with in Chinese literature, it is perhaps no wonder that when our subjects were asked to check them for preference, they might perhaps respond simply by thinking over the different color words and judge on the basis of familiarity or frequency of association. If such be the case, we failed to isolate association from preference in our test. On the other hand, it clearly demonstrated the influence of color association upon color preference.

*b. Tradition influence.* The former national flag of the Chinese Republic contained five simple stripes, namely, Red, Yellow, Blue, White, and Black, all of which are comparatively more preferred by our subjects. Several years ago, when the Kuomintang Nationalist Government came to power, the national flag was changed to only three colors, with twelve White stars on Blue background arranged along the circumference of a circle, all occupying the upper left-hand corner of a larger Red ground, generally similar to the American flag. The meaning of this design is that a White sun on Blue sky will shine Red on earth. It happened that these colors are also the most preferred ones in our subjects. Is this merely a coincidence? Can the national-flag color combination exert some indirect influence upon our subjects' color preference? It is at least a plausible theory. It is quite conceivable that these young school pupils, who were all nominally expelled from their native land, Manchuria or the Three Northeastern Provinces, by Japanese occupation, actually were inspired to think frequently of colors of their national flag and hence some associational influence was exerted on the checking of their color preference.

*c. Language influence.* Another possible explanation of our result is that these nine color words (Chinese characters) have other associative meanings beside those denoting colors. The Chinese character for White,<sup>2</sup> for example, means also pureness, while the Chinese character for Gray usually denotes more than the gray color. Grayness is a symbol for everything negative, disappointing, discouraging, or pessimistic, while whiteness represents everything open, clear, unselfish, as well as pure. It is perhaps inevitable that the students, when asked to judge for color preference, must think

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<sup>2</sup>It was noted later by Mr. N. C. Shen that the Chinese character for White is especially legible in comparison with the other color characters. This relative legibility may influence the preferential checking of the color characters.

of something which may be taken as a basis for their preference in checking the paired comparisons. It is very unlikely that they merely judged on the basis of color words themselves. If such be the case, then it is association rather than preference that determined the relative positions of the different color words on the so-called color-preference scale. This fact raises the question whether color words are really the same as actual colors. Contrary to Michaels' contention (8), the present authors doubt, on the basis of their findings, that color words are really the same as actual colors for the purpose of investigating color preference, unless we define color preference in terms of frequency or force of color association.

#### IV. PREFERENCE FOR COLORS OF SPECIFIC OBJECTS

The number of subjects preferring each of the nine colors for every one of the forty-two objects is represented in Table 8. The numerical values in this table represent the number of subjects who preferred certain colors listed on the top for a certain particular object listed on the left. The total number of persons preferring each color for all the objects appears at the bottom of the table. The percentages of preference for these general and specific objects are shown in Table 9. From this table we may note a few striking facts as follows:

a. For every object, both general and specific, *there is always one color predominantly preferred by more subjects than any other color*. For example, out of the 451 subjects, 240 (Table 8) or 53% (Table 9) preferred White for the general appearance of a house, although there are very few white houses in actual life, while only 5 persons or 1% think they should like it to be violet. Similarly, the majority of the subjects (231) prefer a Black fountain pen, only 9 preferring it to be Gray.

b. *Color preferences for general and specific objects do not necessarily agree*. For example, a large number of the subjects (160 or 35.5%) prefer a Blue dress in general, but as many as 263 like a Black winter overcoat, 162 like a Gray rain coat. The majority of the subjects (188 or 41.7%) like White furniture, but many of them (128) prefer Yellow tables and chairs. There are 164 or 36.3% of the subjects who like Red flowers in general, but more (176) prefer a Yellow chrysanthemum; 154 or 34.1% like White

TABLE 8  
PREFERENCE FOR COLORS OF DIFFERENT OBJECTS

Classes	R	O	Y	G	B	V	W	Gy	Bk
A	23	16	27	23	30	5	240	79	8
A1	89	24	37	73	20	3	39	144	22
A2	67	24	17	9	33	6	153	135	7
A3	6	20	22	18	38	5	303	36	3
A4	131	84	77	14	11	51	25	24	34
A5	45	44	60	57	30	34	109	39	33
B	3	6	4	3	160	4	84	42	145
B1	2	17	8	3	129	20	24	124	124
B2	0	6	3	2	265	7	30	39	99
B3	1	18	12	4	70	14	5	64	263
B4	58	29	15	61	93	58	24	19	94
B5	7	28	91	44	24	18	10	162	67
C	44	17	58	39	52	25	165	10	41
C1	26	28	20	19	89	56	64	18	131
C2	11	12	17	4	55	12	29	194	117
C3	6	34	47	7	57	16	179	61	44
C4	14	44	66	11	43	19	111	84	59
C5	10	27	40	5	25	20	170	38	116
D	26	52	73	18	21	20	188	15	38
D1	7	25	74	27	14	12	194	21	77
D2	15	36	76	32	58	46	105	32	51
D3	23	68	128	8	15	43	103	16	47
D4	24	50	89	14	11	45	117	32	69
D5	18	59	76	21	15	42	127	43	50
E	164	27	49	72	17	42	78	1	1
E1	40	25	176	17	6	42	127	4	14
E2	208	14	27	27	3	26	130	2	14
E3	159	21	43	21	10	42	141	3	11
E4	170	12	45	24	27	49	120	1	3
E5	187	10	33	13	11	22	163	1	6
F	32	44	57	66	38	35	154	13	12
F1	30	81	39	42	74	70	14	54	47
F2	52	25	26	91	75	38	137	4	3
F3	22	19	38	96	42	23	194	9	8
F4	35	14	29	126	31	15	187	9	5
F5	150	20	24	42	93	33	60	20	9
G	46	40	72	51	62	21	104	8	47
G1	49	41	79	68	70	26	38	51	29
G2	180	14	23	29	69	10	106	4	16
G3	44	26	26	63	31	11	10	9	231
G4	30	69	69	24	33	38	56	35	97
G5	74	9	21	46	34	8	217	37	5
Total	2328	1279	2013	1434	2084	1132	4639	1736	2297
Rank	2	8	5	7	4	9	1	6	3

interior decoration in general, but many prefer a Blue carpet, a violet vase, and a Red bed cover.

c. The actual *order of preferences* for the nine colors as de-

TABLE 9  
PERCENTAGE OF COLOR PREFERENCES FOR GENERAL AND SPECIFIC OBJECTS  
CORRELATION BETWEEN GENERAL AND SPECIFIC COLOR PREFERENCE

	R	O	Y	G	B	V	W	Gy	Bk
A	.051	.035	.060	.051	.067	.011	.532	.175	.018
A1-5	.150	.087	.094	.076	.058	.044	.279	.168	.044
B	.007	.013	.009	.007	.355	.009	.186	.093	.321
B1-5	.030	.043	.057	.051	.231	.052	.041	.181	.287
C	.098	.038	.129	.086	.115	.055	.366	.022	.091
C1-5	.030	.064	.084	.020	.119	.055	.245	.131	.207
D	.058	.115	.162	.040	.047	.044	.417	.033	.084
D1-5	.039	.106	.198	.045	.050	.083	.286	.064	.130
E	.363	.060	.109	.160	.038	.093	.173	.002	.002
E1-5	.334	.032	.144	.045	.025	.080	.304	.005	.021
F	.071	.098	.126	.146	.084	.078	.341	.029	.027
F1-5	.124	.071	.069	.176	.139	.079	.262	.042	.032
G	.102	.089	.160	.113	.137	.047	.230	.018	.104
G1-5	.167	.071	.097	.121	.105	.041	.189	.060	.123

terminated by the total number of persons checking each of the 42 objects is: White, Red, Black, Blue, Yellow, Gray, Green, Orange, and Violet. This means that, for all the 42 objects taken as a whole, most of the subjects prefer them, on the average, to be White, Black, or Red, but very few like them to be Orange or Violet.

d. *Variations in color preference for different objects are very great.* This is clearly shown in Table 10, where we notice, for

TABLE 10  
VARIABILITY OF COLOR PREFERENCE FOR DIFFERENT OBJECTS

	Total	Med.	M.V.
White	4639	110.0	57.50
Red	2328	31.0	40.95
Black	2297	39.5	41.02
Blue	2084	33.5	29.71
Yellow	2013	39.5	25.43
Gray	1736	28.0	31.29
Green	1434	24.0	21.85
Orange	1279	25.0	14.12
Violet	1132	22.5	14.19

example, that out of the total number of 4639 preference ratings for White for all 42 objects, each object receives, on the average, a median rating of 110.0 with an M.V. of 57.50. On the other hand, the least preferred Violet has only a median score of 22.5 rating with an M.V. of 14.19. In general, when the median prefer-

ence rating is high for a certain color, the variability of that preference rating is also large, and *vice versa*.

*Preference for Color Words vs. Colors of Objects.* The order of preference for color words as found in Part I of the test is: White, Blue, Red, Yellow, Green, Black, Orange, Violet and Gray; while that for the colors of objects as found in Part II of the test is: White, Red, Black, Blue, Yellow, Gray, Green, Orange, and Violet (Figure 3). In both cases, White was decidedly pre-

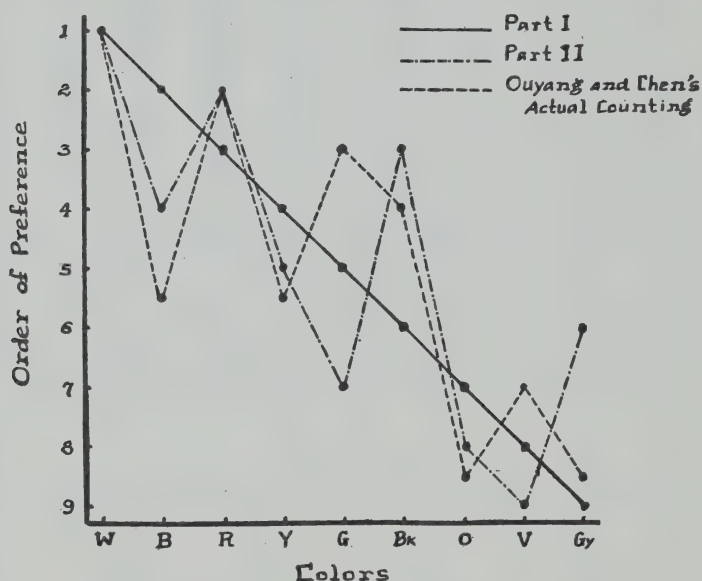


Fig. 3 Rank Order of Different Color-words, Colors of Objects And Frequency of Usage In Poems and Prose

ferred to all others, although Black and Gray were moved up several ranks when subjects were forced to judge concretely as to which color they like most for which object in Part II of the test. The rank-order coefficient of correlation between the results of color words and that of colors for objects is  $+.75$  and that between the latter and Ouyang and Chen's rank order of frequency of occurrence of these nine colors is  $+.75$ . In other words, vague, indefi-



nite preference for color words is fairly correlated with definite preference for imagined colors of concrete objects, and the latter preference is again fairly correlated with frequency of usage in the Chinese language of the color words themselves. Hence we may infer that the so-called color-preference test is not necessarily a test of color preference at all. It is due to this fact that we do not now agree with Michaels' contention that color words are just as good as actual colors in the color-preference test. When the orders of preference for color words and colors of objects agree fairly well, we are obliged to explain why there is such an agreement. Furthermore, why is the order of preference more different in the case of definite, concrete objects than in the case of one vague, indefinite class or group of objects?

*General vs. Specific Color Preferences.* In order to answer the above questions, it is perhaps profitable for us to distinguish two kinds of color preference, one general and the other specific. By general color preference we mean the vague, average, or abstract preference for a certain color in and by itself without reference to any definite, individual, or concrete object; by specific color preference we mean, on the other hand, that color preference sometimes refers only to the situation when we have some or many definite, concrete, and specific objects in mind to prefer. We have just shown that variability is great when the subjects choose their preferred colors for different objects. Now let us see whether there is any correlation between the color preference of a general object and that of specific ones of the same group as well as between those of different groups. Table 9 shows the relative percentages of color preference for general and specific objects of different groups. In general, this table shows that there is a tendency for a certain color to be preferred for the general object in a given group as well as for the specific objects in that group, and vice versa. Table 11 shows the rank orders corresponding to the values in Table 9. That orders of preference between the general and the specific objects of each group are highly correlated may be clearly seen in the two corresponding ranks. On the basis of these rank orders of the preference for general and specific objects of different groups, we calculated the coefficients of correlation between general and specific objects in the same group as well as between those in different groups. These correlations are shown in Table

TABLE 11  
ORDER OF COLOR PREFERENCE FOR GENERAL AND SPECIFIC OBJECTS

	R	O	Y	G	B	V	W	Gy	Bk
A	5.5	7	4	5.5	3	9	1	2	8
A1-5	3	5	4	6	7	8.5	1	2	8.5
B	8.5	5	6.5	8.5	1	6.5	3	4	2
B1-5	9	7	4	6	2	5	8	3	1
C	4	8	2	6	3	7	1	9	5
C1-5	8	6	5	9	4	7	1	3	2
D	5	3	2	8	6	7	1	9	4
D1-5	9	4	2	8	7	5	1	6	3
E	1	6	4	3	7	5	2	8.5	8.5
E1-5	1	6	3	5	7	4	2	9	8
F	7	4	3	2	5	6	1	8	9
F1-5	4	6	7	2	3	5	1	8	9
G	6	7	2	4	3	8	1	9	5
G1-5	2	7	6	3	5	9	1	8	4

TABLE 12  
CORRELATION BETWEEN GENERAL AND SPECIFIC COLOR PREFERENCES

	A	B	C	D	E	F	G
A1-5	.775	— .108	.221	.262	.420	.329	.179
B1-5	— .071	.609	— .133	— .283	— .846	— .475	— .050
C1-5	.479	.850	.300	.400	— .433	— .117	.283
D1-5	.129	.425	.367	.817	— .121	.298	.400
E1-5	.054	— .550	.525	.483	.946	.500	.417
F1-5	.354	— .168	.450	.083	.696	.717	.500
G1-5	.346	— .025	.642	.400	.604	.350	.667

Av. of total (49) correlations ..... .263  
 Av. of general and specific correlations (42) not of the same group .193  
 Av. of general and specific correlations (7) of the same group .... .690

12. The italicized figures in this table are the coefficients of correlation of color preferences between general and specific objects in the same group; other figures are correlations between general and specific objects in different groups. Correlations between general and specific objects in the same group are generally higher than those in different groups. This indicates that color preference for a general object is highly correlated only with those specific objects of the same group. If the specific objects do not belong to the same group as the general object, the correlations of their preferences are comparatively lower. Thus we see that the average of all 49 correlations between general and specific objects of the same group as well as of different groups is  $+.263$ ; that of the G-S correlations of different groups is  $+.193$ ; but that of the

G-S correlations of the same group is  $+.690$ . Correlations between general and specific objects of different groups may be as high as  $+.850$  but they may also be as low as  $-.846$ . On the other hand, those G-S correlations of the same group ranged only from  $+.300$  to  $+.946$ , with also a smaller variability. Hence we may conclude that although color preference changes as object changes, in one general group of objects the preference is more or less constant. The question now is whether a general color preference exists in and by itself without, on the part of the expressive subject, actual, imaginary reference of that preference to some definite, concrete, and specific object in the experience of the subject. In other words, what do we mean when we say that one prefers Red and another prefers Blue? Do we mean to say that one prefers Redness and another Blueness in and by themselves? In short is subjective preference possible without objective reference? The above results seem to indicate that a general color preference does not exist without specific reference to concrete objects in daily life. From the size of the correlation between absolute, general preferences for color words in Part I of our test and the relative, specific preferences for colors of objects in Part II, we may perhaps infer that, when we compare the different color words for preference, we can not very well judge on the basis of the colors or color words themselves without reference, implicit or explicit, to some associated colored object.

This leads us to the problem of the relation between color preference and color association. It may be argued that fair positive correlation between general and specific color preferences is due to the fact that all general color preferences are perhaps inevitably specific in nature, that is, most subjects decide upon a preference on the basis of associations implicitly aroused. Dorcus (4) has shown that subjects give more associative words to the saturated series than to the unsaturated series. It is perhaps reasonable to suppose that degree of preference for a color is proportional to the number of associations possible for that color.

## V. SUMMARY AND CONCLUSIONS

A Chinese Color-Preference Test was devised and applied, which consists of Part I for testing preference for nine color words by the

paired comparison method, and Part II for testing preference for colors of 42 objects of everyday life by checking nine possible colors listed before the question asking what color one prefers for each object. Two Middle Schools in the City of Peiping had been tested, one Chinese private school yielding 230 subjects of all grades (1st to 6th year) and another missionary school yielding only 127 subjects of the third year or grade. One college group yielded 94 subjects.

1. The nine color words used in Part I of the test are Chinese characters corresponding to Red, Orange, Yellow, Green, Blue, Violet, White, Gray, and Black. The final rank order and scale of preference were determined from 451 subjects by thirty-six paired comparisons among these nine color words. The use of color words instead of actual colors was justified, when we planned our experiment, on both theoretical and practical grounds, theoretically because Michaels seemed to have demonstrated previously that color words are just as good as actual colors, and practically because it is more convenient and less expensive, and it also avoids fatigue, adaptation, and contrast effects. However, our results seem to show that Michaels' contention is incorrect. *Color words and actual colors* are perhaps different in effect in eliciting color preference responses, because, in the Chinese language at least, these nine color words (Chinese characters) have abundant shades of associative meaning other than those denoting colors pure and simple. This is brought out by the fact that these nine Chinese color characters give a fairly high positive correlation between their relative rank of preferential order and their relative rank of frequency of usage in the Chinese language. This means that preference and habitual usage are inseparable; color preference and color association are intimately related. Unless we content ourselves with the relative frequency of color association as *the* measure of the relative degree of color preference, we have to admit that color words and actual colors must necessarily elicit different responses in the traditional color-preference test.

2. The preference scale of 451 Chinese Middle School and college students, as determined by the most accurate technique of paired comparisons, is radically different from any of the racial groups. According to Garth, authority on this subject, four of the six total racial groups preferred White and Yellow least. But our



Chinese students show a decided preference for White and Blue but a decided non-preference for Violet and Gray.

a. This seemingly unreasonable color preference for non-color is, according to our view, perhaps a supplementary proof that color preference is inseparable from *color association*, especially when color words instead of actual colors are used in the color-preference test. It is shown that frequency of usage of the nine color words in the Chinese language is positively correlated with preferential rating by the subjects. This clearly shows that the subjects were judging color preference on the basis of frequency of color association.

b. This matter of color association suggests also the possible *influence of tradition* on preferential judgment. Although the dominant color of the Chinese National flag is Red, the symbol of the twelve stars in the flag is White and Blue. In view of the fact that one of the two private schools tested was a recently organized institution for students expelled out of Manchuria (the Northeastern Three Provinces) by Japanese occupation in 1931, their patriotism had perhaps made them think, at the time of answering the test, more of the National flag colors than of colors of any other convenient object.

c. The nine color words do not exclusively mean colors pure and simple. Some of them have at the same time several meanings. White, for example, means also open, clear, unselfish, while Gray means everything negative, disappointing, discouraging or pessimistic. Thus we see language itself exerts perhaps some appreciable influence on the so-called color-preference test based on color words.

3. The forty-two objects whose preferred color was asked in Part II of the test belong to seven general groups, namely, House, Dress, Decoration, Furniture, Flowers, Interior Decoration, and Stationery, each having five specific objects as representative of each general group. There is definitely a general tendency for subjects to prefer one color above all others for both general and specific objects, although for general objects there is more consistency. When one prefers one color for a general group of objects, one does not necessarily prefer the same color for the specific objects in that group. The scale of preference for the nine colors specifically referred to the general and specific objects is a little different from



that obtained in Part I of the test. Variations in color preference for different objects are very great.

4. Nevertheless, there is a fairly high positive correlation between the orders of color preference for color words and that for colors of general and specific objects. Frequency of usage of the color words in the Chinese language is also positively correlated with preference for colors of objects.

5. On the above grounds, we are disposed to distinguish general from specific color preference. When subjects are asked their preference for mere color words or for colors of a general group of objects, only general color preference is sought for. But when they are asked to specify their preference for colors of concrete objects, this preference is specific in nature. The traditional color-preference test is supposedly a test of only general color preference. But results of our specially devised color-preference test for Chinese students seem to indicate that general color preference is possible on the implicit assumption that preferential judgment can be reached only by specific reference either to a general group of objects or to the specific objects within a general group. Since general and specific color preferences are positively correlated, we are forced to the conclusion that the so-called color-preference test is a very complicated affair. It is perhaps more a test of the force of color association than a practical tool to obtain racial color-preference scales. In short, color preference is more relative than absolute.

The above discussion may be summarized as follows:

1. The order of preference for color words, based upon results of 451 Chinese Middle School and college students, is: White, Blue, Red, Yellow, Green, Black, Orange, Violet, and Gray. This result is comparable with that of other races. The striking difference of Chinese preferring White and Blue is explained by association, tradition, and language usage. This difference is also brought out by the order of preference for colors of concrete objects, which is: White, Red, Black, Blue, Yellow, Gray, Green, Orange, and Violet.

2. Color preference is a function of the colored object. General color preference exists only in so far as the preference is a reference to specific objects. There is a fairly high positive correlation between general and specific color preferences.

3. There is a need to stress the distinction between color discrimination, color preference, and color association. Failure to

note the intimate relation between color association and color preference may, perhaps, belittle the significance of a large number of testing results in the past, yielding only a very unreliable scale of five or seven points for the few primary colors. It is the contention of the present writers that a thorough, concentrated analysis of the factors conditioning specific color preferences is perhaps far more fruitful than mere efforts to secure various scales of color preference which, although based upon thousands of individual cases, yield conflicting results very difficult to interpret.

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## LES PRÉFÉRENCES DE COULEURS GÉNÉRALES ET SPÉCIFIQUES DES ÉTUDIANTS CHINOIS

(Résumé)

L'ordre de préférence des mots de couleur, basé sur les résultats de 451 étudiants chinois de l'école secondaire et de l'université, est: blanc, bleu, rouge, jaune, vert, noir, orange, violet, et gris. Ce résultat est comparable à celui d'autres races. L'étonnante différence de la préférence du blanc et du bleu par les Chinois s'explique par l'association, la tradition, et l'usage linguistique. Cette différence se montre aussi dans l'ordre de préférence pour les couleurs des objets concrets, lequel est: blanc, rouge, noir, bleu, jaune, gris, vert, orange, et violet.

La préférence de couleur est une fonction de l'objet coloré. Une préférence générale de couleur existe seulement quand la préférence se rapporte aux objets spécifiques. Il y a une corrélation positive assez élevée entre les préférences de couleur générales et spécifiques.

Il faut appuyer sur la distinction entre la discrimination des couleurs, la préférence et l'association des couleurs. Le manque de notation de la relation intime entre l'association des couleurs et la préférence des couleurs peut peut-être nuire à la signification de beaucoup des résultats des tests antérieurs, qui n'ont donné qu'une échelle de cinq ou de sept points de très peu de valeur pour le petit nombre des couleurs primitives. Les auteurs de cet article croient qu'une analyse profonde concentrée des facteurs qui conditionnent les préférences spécifiques de couleur est peut-être de beaucoup plus de valeur que les simples efforts d'obtenir diverses échelles de préférence de couleur, lesquelles, bien que basées sur des milliers de cas individuels, donnent des résultats en conflit très difficiles à interpréter.

CHOU ET CHEN

## ALLGEMEINE GEGEN SPEZIFISCHE FARBENVORZÜGE BEI CHINESISCHEN STUDENTEN

(Referat)

Die Anordnung der Vorzüge für Farbenwörter, die auf den Ergebnissen von 451 chinesischen Schülern der Mittelschule (middle school) und Universitätsstudenten beruht, ist weiss, blau, rot, gelb, grün, schwarz, orange, und violett.

Farbenvorzug ist eine Funktion des gefärbten Gegenstands. Allgemeiner Farbenvorzug besteht nur dann, wenn der Vorzug sich auf bestimmte Gegenstände bezieht. Es gibt eine ziemlich hohe positive Korrelation zwischen allgemeinen und spezifischen Farbenvorzügen.

Es besteht keine Notwendigkeit, den Unterschied zwischen Farbenunterscheidung, Farbenvorzug, und Farbenassoziation zu betonen. Die Nichtbeachtung der engen Beziehung zwischen Farbenassoziation und Farbenvorzug kann vielleicht die Bedeutung der grossen Anzahl der Ergebnisse der Vergangenheit, die nur eine sehr unzuverlässige Skala von fünf oder sieben Punkten für die Grundfarben aufstellen liessen, herabsetzen. Es ist die Behauptung dieser Autoren, dass eine gründliche, konzentrierte Untersuchung der Faktoren, die die spezifischen Farbenvorzügen bestimmen, vielleicht weit fruchtbarer ist als die blossen Bestrebungen, verschiedene Skalen des Farbenvorzuges aufzustellen, die, obgleich sie auf Tausende von individuellen Fällen gegründet sind, widerspruchsvolle Resultate liefern, die sehr schwer zu deuten sind.

CHOU ET CHEN

# EXPERIMENTAL STUDIES OF CHANGES IN ATTITUDES: I. A STUDY OF THE EFFECT OF ORAL ARGUMENT ON CHANGES OF ATTITUDE\*<sup>1</sup>

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## I. INTRODUCTION

The Speech of man is one of the most obvious of his social activities. Our educational systems lean heavily on the presumption that speech is a vital tool in the stimulation of individual development. The lawyer and theologian carry on their work almost entirely through the use of speech. The zealous protection of the right of freedom of speech in democratic societies may be said to be based on the premise that where men do not enjoy freedom of speech they soon become slaves. Millions of dollars are spent annually by advertisers with a naive faith in the power of the word to convince men and move them to action. The use of speech by man is a psychological phenomenon unique in the world of subjects for scientific study. Yet in spite of all these facts, one finds surprisingly few reports in the scientific literature of objective measurements of the actual effects of the use of speech on the social environment.

To be sure the early philosophical psychologists studied the problem of the psychology of belief, but as psychology broke away from philosophy and became more and more scientific, the study of the phenomena of belief was pushed more and more into the background. The methods characteristic of the work of early scientific psychology were not easily adapted to the problem; and devices which made possible the quantitative description of the nature of belief or

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<sup>1</sup>The contents of this article were taken from the author's Ph.D. dissertation entitled: "An Experimental Study of the Effect of Argument on Changes of Attitude," on file in the office of the Graduate School of the University of Minnesota. This study was done under the supervision of Dr. Charles Bird of the Department of Psychology, University of Minnesota.



attitude changes evolved slowly. As late as 1918, Jastrow (13) in his *Psychology of Conviction* stated that "The profitable pursuit of the study of the psychology of conviction proceeds by the case method." And quantitative case method studies had not yet been attempted.

Within recent years, however, social scientists have revived interest in the problems of belief in their work with the synonymous concept of "attitude." The death of static and birth of dynamic psychology gave new life to the old subject. Beliefs, as attitudes, are conceived from a quantitative point of view. Many attempts to evolve measuring instruments have been made. Some of the most notable of these have been reported by Willey and Rice (32), Allport and Hartmann (1), Rice (20), Lund (16), Thurstone (26), Thurstone and Chave (28), Harper (12), Allport and Katz (2), Millson (18), and Lickert (15). No attempt will be made to review these contributions here, but the interested student is referred to the following references for review of these and other similar projects. These references also include extensive discussions of the theory of attitude measurement. Allport (3), Bain (5), Cantril (7), Folsom (11), Krueger and Reckless (14), Murphy and Murphy (19), Droba (8, 9), Allport and Vernon (4), Fearing (10), Rice (21), Symonds (24, 25), Thurstone (27), Watson (30, 31), and Young (34, 35).

Some of the studies which have been conducted in this field have thrown some doubt upon the possibility of changing attitudes through the medium of argumentative stimulation. May and Hartshorne (17) concluded that "The mere urging of honest behavior by teachers or discussion of standards and ideals or honesty, no matter how much such general ideas may be emotionalized, has no necessary relation to the control of conduct." Donald Young (33) found that his course in American Race Problems had no effect upon the race prejudices of his students at the University of Pennsylvania and contends that "Such a method cannot be effective for the student's racial opinions and biases have been formed over a period of years beginning early in their childhood, by means which have a more lasting impression than formal lectures and assignments." Such contentions, in addition to the fact that as a teacher of speech the author is professionally interested in determining to what extent attitudes



can be modified or changed by argument, motivated the desire to set up a carefully controlled experiment with this problem as the focal point of investigation.

In addition to gathering data on the central problem, an attempt was made to gather supplementary data on a number of factors commonly assumed to influence changes of attitude. That is, the project was so set up that light could be thrown on a number of questions by varying the conditions of the experiment within the group of subjects used. The major purposes of this study are suggested by the following questions.

1. What statistical indices may be used in most accurately recording changes in attitude in a group and are of such a nature that results in one project may be conveniently and reliably compared with results in another project?
2. Is it possible to produce a significant change in attitude by argumentative stimulation?
3. What percentage of a group may be expected to make a significant change in attitude when an argument is presented to them orally?
4. Is an attitude more markedly changed by an argument which is predominately factual and logical or one which is predominately emotional?
5. Does an individual more markedly change his attitude when he hears an argument from a speaker while a member of an audience composed of individuals who hold approximately the same attitude, or while alone in a room with the speaker who presents the argument to him.
6. Is there any difference in the effect of an argument on the change of an attitude in persons of different sex?
7. What is the relative effect of different speakers who use the same argument on changes of attitude?
8. To what extent does negative suggestibility occur in subjects who listen to argument?

## II. EXPERIMENTAL CONDITIONS

1. *The Measuring Instruments.* The first step in the arrangements for the experiment involved the selection of the attitude to be studied. In taking this step the following factors were considered.

It was desirable to select a proposition on which a large percentage of the group to be studied might be expected to hold a fairly definite opinion. Turteltaub (29) found a bimodal distribution in the studies which he made of the attitudes toward prohibition which existed in a university student population with the use of the Smith and Thurstone Attitude Scale. The subjects used in this study produced a bimodal distribution slightly skewed in an anti-prohibition direction. This distribution assured the experimenter that he was dealing with attitudes which were fairly definite and well crystalized. Moreover, the attitude should be one which has been frequently subjected to argumentative appeal and therefore one on which a considerable amount of speech material existed. Speech material of a type generally considered factual and logical and of the type consisting of emotional appeals was available in abundance on both sides of the prohibition question. Finally it was necessary to select an attitude for which a valid and reliable measuring instrument existed. The Smith and Thurstone "Attitude Toward Prohibition" scale (22), of the Thurstone "Measurement of Social Attitudes," series met these last requirements. Stouffer's study (23) indicated the Smith-Thurstone scale scores correlated highly with other measures of this attitude. The reliability of the test in operation in this study is indicated by a corrected correlation of  $+.94$  for test retest scores. This combination of factors led to the selection of the attitude toward prohibition existing in a university student population as the one to be subjected to this study. It may be noted that the study was carried out in 1931 and early in 1932 before the development of the anti-prohibition reaction which reached its height during and after the presidential campaign of 1932.

2. *Preparation of Speeches.* The second major step required the construction of four speeches. Two were to be in favor of maintaining prohibition and two opposed to it. These speeches hereafter will be referred to as the dry and the wet speeches. One of the dry and one of the wet speeches was to be so constructed that it was predominantly a factual and logical speech and the other speech on each side of the question was to be so constructed that it was predominantly an emotional or persuasive speech. Although the word persuasive is loosely used to apply to any effective argumentative appeal the word is usually used today by teachers of speech

to apply only to that limited type of speech in which little attempt is made to use objectively evaluated evidence. The speech is of the type in which suggestion is employed; stereotypes, sanctions and taboos are used; vivid illustrations are presented; and appeals to the subject's emotional habits are so worked out that critical reactions are generally submerged. An attempt is made to secure a change of attitude by transference of affective reactions. The speech of the opposite type is one in which propositions and issues are analyzed with a coldly detached attitude by the speaker. Factual evidence and logical processes of reasoning are brought to the support of contentions and a general attempt is made by the speaker to arouse rather than stifle critical reactions. Now it is no doubt true that one cannot completely eliminate persuasive factors from any speech, and that likewise a persuasive speech frequently may be free from obviously logical fallacies. These overlapping characteristics, however, do not make impossible the development of speeches which are predominantly persuasive or predominantly logical.

The Attitude Test to be used was analyzed for suggestions which might serve as main ideas to be used in the development of the speeches. Four such main ideas to which all the specific items in the scale applied were discovered. The literature was studied for material bearing upon these central problems. This material was classified in files on the basis of the type of material required for each of the four speeches. Most of the material was taken from speeches, magazine articles, pamphlets, and books of the wet and dry enthusiasts. One had every reason to assume that it had been used originally with a sincere intention of moving someone to believe in or oppose prohibition. The experimenter decided upon this procedure in order to secure material which might be said to be actually representative of the arguments on both sides of the controversy.

Each file of material was sorted to secure what was judged the most logical and most persuasive arguments available on each side of the four main issues. This material was then edited to mould it into a unified and coherent speech form. In selecting and editing the persuasive material, the experimenter attempted to select that material which might appeal to college students. The speeches were so constructed that each approximated 2500 words in length. The principal reason for arbitrarily deciding upon this length was

that it enabled the presentation of two speeches within a class hour.

In order to assure himself that speeches had been constructed which would be considered typically logical or persuasive speeches, the experimenter submitted the manuscripts to ten university teachers of speech for a rating as to validity of type. The rating scale scores returned by these teachers not only showed that the speeches were typical of the type they were designed to represent, but also that the opposing logical and persuasive speeches on each side of the question represented approximately equal degrees of extremeness of typicality of the type in question. This validation enabled the experimenter to proceed with greater assurance in referring to these speeches as being logical or persuasive.

3. *Subjects.* All of the subjects used in this study were college students enrolled in courses in public speaking. Most of them were sophomores, some juniors and seniors, and a few freshmen. In the spring of 1931, a group of 363 students from the Arts College Speech Courses at the University of Minnesota comprised Group I. In the spring of 1932 a second group of 444 students from the University Arts College, the University College of Agriculture, and a small group from Hamline University in St. Paul served as subjects in Group II. From these two groups, 100 students were selected from each group as control subjects. In compiling the data for these groups, all scores were combined, and the two groups treated as one. The data for the 200 control subjects from these groups were combined with the data from 100 control subjects used in another similar project carried on at about the same time for convenience in working up the data and in order to get as large a control group as possible for purposes of determining the reliability of the scale. This third control group was comparable in every significant way with the groups actually serving as controls in this project. The control group was matched with the experimental group in mean, range of scores, and sex. Thus this report contains data on 607 subjects serving in experimental groups and 300 additional subjects serving as controls.

4. *Administration and Scoring of the Tests.* The procedure adopted in the first testing of all subjects may be described as follows. The cooperation of the instructor in charge of the class to be tested was secured, and twenty minutes of the class time was requested. The experimenter passed out the test material, Forms A



and B of the Prohibition Scale, to the members of the class. The subjects were told not to read the scale until all had copies. Then the experimenter read aloud the directions on the test blank. All subjects were requested not to observe other papers or to communicate with neighbors, and to refrain from any discussion of the items of the scale after class. When questions about the use or purpose of the tests were asked, the subjects were promised that no one but the experimenter would know their personal scores, that the study was being carried on as a piece of scientific research in no way connected with partisan interests, and that within a week or two, if desired, the purpose of the test would be explained. In all cases this put a stop to questioning and the taking of the test proceeded. After the scales had been checked and collected, and after a further caution to refrain from discussing the test until the project was completed, the experimenter withdrew and the class continued its regular work.

The tests then were scored. In order to secure the greatest possible reliability in measurement both forms of the test were used. Smith and Thurstone's "Instructions For Using the Scale Attitude Toward Prohibition" (22) gives directions for scoring single forms only, and suggests that the median scale value on a single form be used as the individual's attitude score. In order to secure a unit score for the two forms, two methods of scoring were studied. One hundred tests were scored in two ways; in the first place by securing the median of the 44 statements in both scales (22 in each scale) and deriving a single score; in the second place by securing the mean of the median score values for the two scales. When scored separately these two ways of scoring the test yielded scores which correlated  $+ .98$ . Thereafter only the easier form of scoring, that of scoring the two forms separately and then deriving a final score which was the mean of the two form scores, was used.

5. *Classification of Subjects and Preparation of Speakers.* Earlier in this report a statement was made to the effect that in this project the experimenter sought data not only on the main problem as to the extent to which attitudes could be changed by argument, but also on a number of factors which might variously contribute to the effectiveness of the use of argument in the attempt to produce a change of attitude. The method used in obtaining this data was progressively to subdivide the major group into smaller and smaller



groups and to vary the conditions by adding another controlled variable for each of the subdivisions. To illustrate: the wet subjects were divided from the dry subjects in the first subdivision. The dry subject group was split and half given a logical appeal and half a persuasive appeal. The group receiving the persuasive appeal was split and half heard the appeal while members of an audience or in a "together" situation, and half heard the appeal individually, that is while "alone" in a room with the speaker in a face-to-face situation. Half of the group hearing the speech alone heard it from a man speaker and the other half heard it from a woman speaker. Approximately half of the woman speaker's subjects were women and half were men. In this illustration the subdivisions are carried out only for one-half of the group but all groups were subdivided in the same manner. All subgroups were closely matched on the basis of average score, range of score, and sex. Moreover this subdivision and matching of subgroups was so arranged in all groups that all wet and only the wet subjects were given a dry speech and all drys and only the drys were given a wet speech. In making this first subdivision all students below the midpoint score for the neutral attitude group were considered wet and all students whose score was above the midpoint for the neutral group were considered dry. It should be noted that no student served in the experiment more than once.

Such experimental subgroup classification enabled the experimenter to include all of the subjects in a comparison of two variables while holding all other variables constant. To illustrate: the results for all men could be compared with the results for all women because an equal number of men and women heard the logical and persuasive speeches; heard them while alone and while in a group, and from men and women speakers. Thus all of the subjects could be used in each comparison. By this technique more data were obtained from the subjects than would have been possible if only two variables with a small number of subjects in each subgroup had been compared.

Four students who were taking advanced work in the Department of Speech of the University Arts College were selected to serve as speakers for Experimental Group I. Students were selected who were known to have definite interest in speech skill and pride in speech accomplishments. Only student speakers were used who agreed to

devote from 35 to 50 hours to the project. Each speaker entered into the experiment with a full knowledge of the purpose of the study, and some attempt was made to get the speakers to compete with each other to see who could produce the most effect. Two of these speakers memorized both speeches on one side of the question, and the other two memorized both speeches on the other side of the question. One speaker on each side was a man and the other was a woman. The experimenter heard each of the speakers several times before the experimental speaking began and assured himself that the material would be spoken with a minimum of variation from time to time. The speakers were then considered ready for the experimental procedure. The set-up for Experimental Group II was much the same, with one exception, as for Experimental Group I. This exception involved the substitution of an entirely new group of speakers in the second group for that used in the first group. It may be noted here that the only purpose of organizing the second group was to increase the significance of findings by enlarging the size of the total group. No attempt was made to equate precisely the speaking ability of speakers used, but the experimenter did attempt to select speakers who might be considered of approximately equal ability.

6. *Presentation of the Argument.* In presenting the argument to the subjects the following procedure was adopted. In the case of those who were to hear the speeches while "*together*" the instructor in whose class the students were registered was asked to excuse the students for the hour, and the students were assigned to various classrooms where the experiment was to be carried out for their group. When the students arrived, the experimenter announced that Miss, or Mr. So and So was going to talk to them about prohibition. The speaker was introduced, took the platform and gave the speech assigned for that particular group. Just as soon as the speaker finished speaking the experimenter requested the members of the group not to talk about the speech until the project was completed. Then copies of the Attitude Test were passed out to all students and with a brief reading of directions for taking the test, they were asked to check the statements on the scale again. After the test forms were collected, the subjects were given copies of an Information Questionnaire and asked to answer certain questions regarding their year of registration, reaction to the speeches, and

so forth. When this was completed and the papers collected, the experimenter explained that this completed the project. Any questions asked were now frankly answered. Before dismissing the subjects, the importance of keeping a knowledge of the experiment from other students who might serve as subjects at a later time was fully explained. The subjects were asked to cooperate further by not divulging any information about the experiment. On the basis of data compiled from the answers to one of the questions in the Information Questionnaire, there is considerable reason to believe that the subjects did so cooperate by not discussing the project. It will be noted that an attempt was made to keep all of the subjects unsophisticated regarding the purpose of the study. The experimenter felt that if the subjects knew that a deliberate attempt was being made to change their attitudes toward prohibition, cooperation would not be as complete as it would if they were kept in the dark about the true purpose of the project. As the experiment progressed, although a few students indicated that they understood what we were trying to study, again the response in the Information Questionnaire indicated so few had guessed the nature of the project that their influence on the composite result was negligible indeed.

The subjects who were to hear the speech in the "alone" situation were put through practically the same procedure. They were asked to report to the experimenter's office, and he took them to the room where the speaker was waiting, introduced the subject to the speaker, seated them across a table from each other, asked the subject to refrain from questioning the speaker in order that he might finish during the hour, and withdrew. When the speaker finished, he told the subject they were both expected back in the office. When they reached the office, the speaker withdrew; and the subject was seated and given the test again. Otherwise the procedure was similar in the "together" and "alone" situations. The together subjects in Experimental Group I in most cases were addressed together in one group. In Experimental Group II each speaker spoke to an average of three groups in the together situation. In both groups the speakers spoke to some subjects alone, then spoke to a group, then more subjects alone, then to a group and so on in order to keep the possible variation in the method of giving the speech somewhat comparable for both situations. The speakers were timed and

there was little variation from an average of twenty minutes required by all speakers in giving the speeches.

The time elapsing between the taking of the first and second tests by the subjects varied from two to six weeks. In order to prevent spurious propaganda influences from affecting the students of one experimental variable relatively more than others, work on all variables was carried on at the same time. Approximately one-third of the control subjects were tested during the second week, one-third during the fourth week, and the last third during the sixth week. Thus the time elapsing between test and retest for all groups was approximately equal.

### III. PRESENTATION AND DISCUSSION OF THE DATA

1. *Control Subjects.* Since the procedure adopted for the interpretation of the data of this study is based upon an analysis of the cases serving as controls, it will be desirable to present the data for control subjects first. Three hundred subjects in all were given a test and a later retest without having received any of the argumentative stimulation to which the experimental group was subjected. Now if the change in the experimental group was significantly different

TABLE 1  
CONTROL SUBJECT DATA SCALE RELIABILITIES

	Number of cases	Mean on first test	Standard deviation on first test	Mean on second test	Standard deviation on second test	Coefficient of correlation
Test retest for combined Form A and B	300	5.11	1.57	5.20	1.63	+ .88
Test retest for combined Form A and B—men	151	4.71	1.48	4.75	1.51	+ .91
Test retest for combined Form A and B—women	149	5.51	1.59	5.66	1.59	+ .82
Form A with Form B in first test	300	5.00	1.65	5.29	1.63	+ .79
Form A first test with Form B second test	300	5.00	1.65	5.34	1.56	+ .79



from the change in the control group, and if the test is reliable, we may assume on the whole that this difference was the effect of the argumentative appeals presented to the experimental group.

The scale scores from the subjects in the control group served not only as a means of checking on the results of the experimental group but also as a means of determining the reliability of the test. Table 1 presents data on the reliability of the test from several points of view. The correlations presented are raw correlations. The first line in the table presents the data on the mean, standard deviation, and correlation of test retest scores when the mean of the scores of the two forms is taken as the individual score. The mid-point of the neutral area on the scale used as the point of division of the wets from the drys falls at 5.50. The mean for the entire control group is thus seen to indicate a slight skewing of the distribution in the direction of wetness. The amount is so slight, however, that it can hardly be considered significant. An uncorrected coefficient of reliability of  $+.88$  is high enough to be considered quite satisfactory. This is especially true in measurements such as these where elements other than those inherent in the reliability of the test, such as the influence of spurious propaganda, may influence a change of a score from test to test. The second and third lines of the table present the data on test scores and reliability of the test for men and women subjects considered separately. Bain (6) has made a statement to the effect that women show more stability of response to attitude questionnaires than do men. If suggestion is influential in changing attitudes, this position would be inconsistent with the trend of evidence collected in the past which indicates that women are more susceptible to suggestion than men, and is further contradicted by the results of this study. The reliability of women's scores is here seen to be .09 points lower than the reliability for men's scores. Another interesting fact emerges when we compare the means for men's and women's scores. The average score for women is considerably more dry than the average score for men. What this actually means is that there are more dry women than men and more wet men than women. The range and ratio of scores for wet and dry men and women were so controlled that they were approximately the same in the experimental as in the control group in order that the two groups might be compared. The last two lines in Table



I present the data on the two forms of the test when considered separately. We see that the reliability of the test is considerably lowered when only one form is used at a time. This is one justification for the use of a combination of both forms of the test before and after the experimental stimulation. Another justification is found in the fact that there is quite a difference in the mean scores for the two forms. The mean score for Form B is considerably more dry than the mean score for Form A. It would have been necessary to compensate for this difference in all experimental data if one form only had been used.

Two modes of procedure were adopted in analyzing the data. In the first place the data to be interpreted were analyzed from the point of view of group changes. The mean and standard deviation of the group scores were selected as the most significant measures of central tendency and distribution of scores. With these indices it is possible to determine the statistical significance of any group changes by the computation of the difference over the standard deviation of difference for the group.

The second mode of attack in this study involved an analysis of individual scores. In this procedure it seemed desirable to determine by just how much an individual's score on the test given after hearing the argument must differ from his score on the first test to amount to a significant difference. The standard error of measurement is a statistical device used for determining the significance of a difference in the two scores an individual may receive when he takes the same test twice. A difference equal to three standard errors of measurement is always considered a significant difference, and differences less than three standard errors have varying degrees of significance. This index is a standard statistical device which the writer feels deserves the serious consideration of all students of attitude measurement. It can be easily computed from the data of any study in which control subjects are used, and they should be used in all studies of this type. The task of comparing the effects of various kinds of stimulation then becomes simply a matter of comparing the relative percentages of the individuals in the groups in question who make a change greater than three standard errors.

When the standard error of measurement for the control group of 300 subjects was computed it was found to be .56 steps of the

Attitude Scale. Because of the fact that the Smith-Thurstone Scale values can be conveniently grouped in .50 or one-half step intervals, and because this unit so nearly approximated the .56 unit of the standard error of measurement it was decided to consider changes greater than 1.50 steps on the Attitude Scale as indicative of the significant effects of propaganda in this study. In the control group any such changes might be considered the effect of spurious propaganda, and in the experimental group it was considered the effect of propaganda, both spurious and that directly and experimentally applied. Differences in the percentages making such a change in the experimental and control groups might be definitely attributed to the experimental stimulation.

Finally it was decided to present not only the percentages of the members of each group who made a significant change, but also to include in data tables the total percentage of the members of each group who changed either in the direction of the argumentative appeal or in the opposite direction. The reason for this decision will be explained in the following paragraph.

As has been previously noted, in the experimental groups all drys received a wet argument and all wets a dry argument. Subjects who received a score on the attitude test between 5.50 and 8.50, the upper limit of the score range, were considered drys; and subjects who received a score between 5.50 and 2.50, the lower limit of the score range, were considered wets. A change down the scale from a position in the dry group, and up the scale from a position in the wet group, in both cases a change in the direction of the argumentative appeals presented to these respective groups, was considered a positive change. A counter change in each of these groups might be considered the result of negative suggestibility and was called a negative change. Only about 1 per cent of the members of the control group made a significant change in the negative direction, and about 5 per cent made a significant change in the positive direction. In the experimental group only about 1.50 per cent made a significant change in the negative direction. Thus in order to get any measure of the relative degree of positive and negative change it was deemed advisable to include figures not only for the percentages making a significant change but also for the percentages making a change as great as approximately one standard error of measurement of .50

steps on the scale. It may be noted that some of the positive change occurring in both control and experimental groups may have been caused by the fact that each group approached a theoretical extreme on the first tests and the scores on the second tests suggest an expected regression toward the mean for the entire group. In other words a change up the scale was theoretically easier for the wets and a change down the scale was theoretically easier for the dries than a change in the reverse direction. Since significant negative changes for the entire group were so few in number, they are included only in the column in data tables in which percentages making a negative change greater than .50 steps on the scale are recorded. This dual method of analysis then provides two kinds of indices of data results, a group index and an individual index. In the one case we learn how much the group as a whole or on the average has changed, and just how significant the change which has occurred may be considered. In the other case we see what happened to the individual members of the group, that is we see how many changed in the negative direction by as much as one standard error of measurement, how many changed in a positive direction at least one standard error of measurement, and how many changed in a positive direction at least three standard errors of measurement, or made a statistically significant change. It is frequently true in dealing with measurements of change in groups that we want these two kinds of facts from our data, and it is particularly important to have these two kinds of data in dealing with measurement of changes of attitude resulting from argumentative appeals. In some cases in dealing with an audience it may be the desire of the speaker to reach and motivate a change in every member of the audience. He does not hope to secure a significant individual change in many, but he does want to modify the average attitude of the group by changing each and every individual to a slight extent. In other groups the speaker is not interested particularly in changing the attitude of all members of the group, but is interested particularly in changing the attitude of a few individuals to a significant extent. Such would be the situation, for instance, when a speaker seeks to change a marginal minority vote to a majority vote in a group. The group method of analysis gives the average amount of change and the individual method of analysis indicates whether the change

TABLE 2  
DATA FOR FIRST ORDER VARIABLES

	Number of cases	Mean before	Standard deviation	Mean after	Standard deviation	Mean difference	Difference over standard deviation of the difference	Percentage of the group making a negative change over .50 scale steps	Percentage of the group making a positive change over .50 scale steps	Percentage of the group making a positive change over 1.50 scale steps
Dry controls	111	6.97	.73	6.97	.86	.00	.00	31	32	4
Wet controls	189	4.01	.64	4.16	.93	.15	1.88	25	32	5
Dry total experimental	267	6.92	.69	6.32	1.34	.60	6.66	19	58	25
Wet total experimental	340	4.02	.63	4.77	1.29	.75	9.38	15	61	27
Dry logical speech	134	6.88	.73	6.17	1.36	.71	5.47	18	64	29
Persuasive speech	133	6.97	.73	6.49	1.21	.48	4.00	20	52	22
Wet logical speech	170	4.01	.58	4.70	1.25	.69	6.27	14	61	25
Persuasive speech	170	4.04	.58	4.85	1.34	.81	7.37	13	62	30
Dry "together" situation	132	6.97	.70	6.45	1.36	.52	4.00	24	56	20
"Alone" situation	135	6.89	.63	6.20	1.24	.69	5.75	15	62	30
Wet "together" situation	172	4.04	.54	4.69	1.24	.65	6.50	16	58	25
"Alone" situation	168	4.01	.64	4.86	1.24	.85	7.72	11	65	30
Dry men	118	6.92	.56	6.52	1.18	.40	3.33	26	53	16
Women	149	6.94	.75	6.18	1.36	.76	5.85	13	56	32
Wet men	185	3.92	.56	4.56	1.19	.64	6.40	12	57	22
Women	155	4.14	.57	5.03	1.35	.89	8.08	14	67	34
Dry heard men speakers	131	6.93	.77	6.37	1.28	.56	4.31	22	61	25
Heard women speakers	136	6.91	.73	6.29	1.31	.62	4.77	16	57	25
Wet heard men speakers	169	4.03	.66	4.88	1.36	.85	7.08	12	63	30
Heard women speakers	171	4.01	.57	4.67	1.17	.66	6.60	15	61	25

in group average which has occurred is the result of a slight change by a number of individuals, or a large amount of change by a few individuals. If we find that in some groups the average does not change greatly but a considerable number of individuals make a significant change, and in other groups there is a considerable average change, and but few individuals make a significant change, the dual method of analysis makes it possible for us to interpret the situation much more precisely than would either method if used alone.

The first two lines in Table 2 present the data for the control group, and the remaining lines present the data for the first order variables of the experimental group so arranged as to bring out the differences among the variables under study. The first column lists the number of cases in each group. The next six columns present the data in accordance with the group method of analysis. The last three columns present the data in accordance with the individual method of analysis.

Taking up the analysis for the group of dry control subjects the mean for the group is seen not to have changed. The percentage of the group making some change in opposite directions is almost identical. The wet group made a slight change in the direction of greater dryness. The change is very small, however, and may be partially explained as a tendency of group regression toward a mean. The change in a positive direction was only 7 per cent greater than the change in the negative direction. Only 4 and 5 per cent of the dry and wet control groups respectively made statistically significant changes. A point should also be made of the fact that in the control groups, although the standard deviation of the distribution increased somewhat in the second test over that which occurred in the first test the increase was very small in comparison with that which occurred in the experimental groups on retest.

2. *Experimental Subjects.* Although the change recorded for the wet experimental group as a whole was somewhat greater than the change recorded for the dry experimental group as a whole, when the relative amount of change previously noted for the wet and dry control groups is considered, it may be doubted that this difference has much significance. In fact the greater change which occurred in the wet experimental group over that which occurred



in the dry experimental group is exactly equal in amount to the greater change which occurred in the wet control group over that which occurred in the dry control group. Then it may be seen that the dries were exactly as willing to change as were the wets as a result of the arguments presented. The change in both experimental groups was statistically significant. When the individual method of analysis is considered it will be noted that in the dry group about three times as many individuals changed in the direction of the argument as changed in the opposite direction, and in the wet group the ratio of change was four in the direction of the argument to one against. It should be remembered that the change in the two directions for the control group was approximately equal. About 25 per cent of the members of the experimental groups made a significant change in the direction of the argument, whereas the change in the control group was significant in less than 5 per cent of the cases. That is, over five times as many individuals made a significant change in the experimental group as made such a change in the control group. Less than 25 per cent of the individuals in the experimental group made no change, whereas in the control group about 40 per cent made no change. Since the negative change in the experimental group was only about three-fifths of the negative change in the control group, it is evident that negative suggestibility did not operate to any significant extent in the motivation of attitude changes which occurred in this study. There was a greater amount of negative change in the dry than in the wet group. Another point to be noted here is that the standard deviation of the distribution of the experimental group scores after argument is presented is over twice as great as the standard deviation of the distribution of the group scores before the presentation of the argument. These speeches then certainly did not serve to unify the groups involved but in fact tended greatly to increase the diversity of attitudes held in the group. The extent to which any speech could unify the attitudes held in a group would no doubt be dependent upon the extent of unity or diversity already existing in the group addressed, and upon the direction of the appeal presented. If the group were a highly diversified one before the speech or if an appeal were presented to a group in which the diversity of attitude which existed was only a matter of relative degree of support of the proposition for which the appeal was pre-

sented, an argumentative appeal might have the effect of unifying the attitudes of the group. The data of this study can throw no light on this aspect of the problem.

Although the actual change of attitude in both wet and dry experimental groups was approximately the same, in both cases the types of speeches presented to these groups contributed in various amounts to this change. The mean change for the dry group which heard the persuasive speech was only about two-thirds of the mean change for the dry group which heard the logical speech, and there were only about three-fourths as many individuals in the former as in the latter group who made a significant change. In the wet group on the other hand the mean change for subjects who heard the persuasive speech was slightly higher than it was for the subjects who heard the logical speech, and but five-sixths as many individuals in the former as in the latter group made a significant change. This evidence indicates that both types of speeches may be equally effective. Although these college students would no doubt have denied that they could be swayed by an emotional appeal the data show that on the whole approximately as many were swayed by one type of argument as the other. The fact that the logical speech presented to the dry group and the persuasive speech presented to the wet group produced a greater effect than the opposite type of speech produced in the respective paired groups may be explained in several ways. It may be that in spite of the fact that the validation of the speeches indicated that they all possessed relatively equal degrees of typicality, the logical speech given to dry subjects may have been a much better speech than the persuasive speech given to dry subjects and vice versa for the speeches given to the wet groups. Another possibility is that the dry groups of subjects were more receptive to logical than to persuasive argument, and that the wet groups were more receptive to an emotional than to a logical argument. A further interpretation which seems plausible is simply that some individuals are more influenced by logical argument and others are more influenced by persuasive argument; and in this study a greater number of the logically rather than the emotionally minded individuals happened to fall in the dry group and a greater number of emotionally rather than logically minded individuals happened to fall in the wet group. It may be noted that there is some justification for a contention

that alcoholics are frequently emotionally unstable. If this is true, it might throw some light on the interpretation of these data. Regardless of the actual causes of the differences in effectiveness of the different speeches of the two types the author feels that the focal point for emphasis in these particular data is the one which shows that neither type of speech produces uniformly a greater effect than the other.

The next comparison to be made occurs between the groups hearing the arguments in the alone situations, and in the together or audience situations. In both the wet and dry groups, the subgroups which heard the argument alone changed considerably more than the groups which heard the argument while in an audience. In the dry group only two-thirds as many individuals made a significant change in the audience situation as made such a change when the subjects were alone with a speaker who presented the argument to them; and in the wet group only about five-sixths as many individuals made a significant change in the audience as made such a change in the alone situation. Another point to notice here is that there was a greater amount of negative suggestibility in the groups of subjects who heard a speaker in an audience than there was in those subjects who heard a speaker while alone. The explanation of this situation no doubt may be found in the fact that the negative attitudes held by individual subjects were socially facilitated by the incipient negative responses of other members of the group. That there was a greater change in the alone than in the group situation brings experimental verification to the frequently expressed theory that the best way to change a negative to a positive public opinion is through the use of individual work. Again it should be pointed out that conclusions cannot be drawn from these data regarding the most effective mode of procedure when the purpose of the speaker is not so much to break down counter attitudes as to build up or release attitudes which already exist in mild degrees of intensity in the subjects addressed. This latter situation is the one which usually exists when the purpose of the speaker is to stir up a mob reaction. In such a situation group appeals may be more effective in that the direction of social facilitation is then in support rather than counter to the direction of the appeal presented. Even evangelists, however, and evangelistic meetings are frequently studied as examples of the

use of mob psychology, often gain greatest results by circulating among the members of the audience and leading individuals to the altar.

Differences in the effect of argument on men and women are the most marked and most consistent of any in this study. For the dry groups the mean change for women was almost twice as great as for men, and the percentage of the members of the groups which made a significant change was exactly twice as great for women as for men. In the wet groups the change for men was only about two-thirds of the amount of change for women. About one-third of the women in the two groups on the average actually made a statistically significant change in the direction of the argument, whereas the number of men who changed to this extent represent less than one-fifth of the total group. Certainly in this experimental situation the women were much more responsive to argumentative appeals than were the men.

The last of the major or first order comparisons to be made is one in which the effect of the use of argument by women speakers is compared with the use of the same arguments by men speakers. It is sometimes contended that women speakers are not as effective as men speakers. These data indicate relatively little difference in the effects produced by the men and women speakers, when all situations are equated. Since a different group of speakers was used in the two groups of subjects for whom the results are combined in this study, it should be noted that the results presented on each line in the table represent the composite effect of two men or two women. Because of the fact that Table 2 does not present the relative effects produced by individual speakers it seemed desirable to analyze the raw data and see just what their relative effectiveness might be. In Group I the two men produced a significant change in 25 and 26 per cent of their respective groups, while the two women produced a similar change in 26 and 27 per cent of their groups. In Group II the two men secured a significant change in 25 and 36 per cent of their respective groups and the two women produced a significant change in 24 and 22 per cent of their two groups. Seven of the eight speakers were thus seen to have produced approximately the same effects, but the change these seven produced was only about two-thirds the change produced by the eighth speaker, a man. Thus



we have evidence that two speakers, using the same material, may secure remarkably different results with that material. As far as possible this speaker's subjects were equated with those addressed by other speakers, and although difference in subjects cannot be completely eliminated as a spurious cause of this difference in change, the most probable cause in light of controlled conditions of the study is difference in effectiveness of presentation. As to why this speaker was more effective in presentation than the other speakers, the experimenter is unable to draw any conclusions from the data of this study. These data do suggest a method which might be used when individual differences in speaking ability are a focal point of study. The fact that one individual stood out from the group in speech skill should not becloud the fact that seven of the eight speakers produced approximately the same effects. The fact that these seven speakers secured such approximately uniform results when using the same material may be considered as significant as the fact that one speaker was distinctly superior to them.

The presentation of the data on what has been called first order variables has been completed. Tables 3 and 4 present the data on second order variables. Although the data on lower variables are based on smaller groups, in most cases they are large enough to produce statistically significant group differences, and the data do throw light on theories raised frequently in the discussion of social motivation. Taking up the data on the first variable presented in Table 3, it might be expected that persuasive speaking would be relatively more effective in the group situation and that logical speaking would be relatively more effective in the alone or face-to-face situation. What we find is evidence which suggests that in the alone situation there is much less difference than in the group situation in the effect of the speeches of the two types. The immediate presence of the speaker in the alone situation seems to make much less important the type of argument used. In the group situation, on the other hand, the auditor seems more free from the immediate personal domination of the speaker's personality and his arguments become a more vital factor in determining a change of attitude. That is, it is much more important to have a good speech, whether logical or persuasive, in a group than it is when the subjects are alone with the speaker. We find also that whether the speaker used logical or per-



TABLE  
DATA FOR SECOND ORDER VARIABLES

	Number of cases	Mean before	Standard deviation	Mean after	Standard deviation	Mean difference	Difference over the standard deviation of the difference	Percentage of the group making a negative change over .50 scale steps	Percentage of the group making a positive change over .50 scale steps	Percentage of the group making a positive change over 1.50 scale steps
Dry logical—together	68	6.95	.73	6.29	1.42	.66	3.47	19	65	24
Logical—alone	66	6.81	.67	6.03	1.59	.78	3.55	16	66	33
Persuasive—together	64	6.98	.70	6.63	1.29	.35	1.95	28	47	16
Persuasive—alone	69	6.96	.61	6.36	1.14	.60	3.75	13	57	28
Wet logical—together	85	4.06	.44	4.67	1.27	.61	4.08	16	54	21
Logical—alone	85	3.98	.60	4.83	1.11	.85	6.08	11	68	28
Persuasive—together	87	4.03	.55	4.81	1.20	.78	5.58	15	67	29
Persuasive—alone	83	4.04	.67	4.89	1.44	.85	4.72	11	49	31
Dry logical—men	59	6.83	.74	6.33	1.28	.50	2.50	27	59	20
Persuasive—men	59	6.97	.53	6.70	1.10	.27	1.69	25	47	12
Logical—women	75	6.89	.90	6.02	1.49	.87	4.35	11	70	35
Persuasive—women	74	6.97	.76	6.32	1.31	.65	3.83	16	55	30
Wet logical—men	92	3.96	.57	4.58	1.15	.62	4.77	13	58	21
Persuasive—men	93	3.88	.60	4.53	1.20	.65	5.00	12	56	23
Logical—women	78	4.06	.57	4.83	1.34	.77	4.82	14	65	29
Persuasive—women	77	4.22	.77	5.22	1.37	1.00	7.15	14	69	39
Dry heard men speakers—logical	67	7.02	.59	6.34	1.32	.68	3.78	21	66	29
Heard men speakers—persuasive	64	6.86	.71	6.39	1.28	.47	2.61	23	56	22
Heard women speakers—logical	67	6.75	.76	5.99	1.36	.76	4.00	15	66	28
Heard women speakers—persuasive	69	7.07	.61	6.56	1.29	.51	2.83	17	48	22
Wet heard men speakers—logical	81	4.00	.62	4.91	1.41	.91	5.36	10	68	31
Heard men speakers—persuasive	88	4.07	.62	4.84	1.39	.77	4.82	13	58	28
Heard women speakers—logical	89	4.02	.57	4.50	1.25	.48	3.43	17	55	19
Heard women speakers—persuasive	82	3.99	.66	4.85	1.30	.86	5.38	12	66	32

TABLE 4  
DATA FOR SECOND ORDER VARIABLES CONTINUED

	Number of cases	Mean before	Standard deviation	Mean after	Standard deviation	Mean difference	Difference over the standard deviation of the difference	Percentage of the group making a negative change over .50 scale steps.	Percentage of the group making a positive change over .50 scale steps	Percentage of the group making a positive change over 1.50 scale steps
Dry men—together	53	6.93	.75	6.53	1.40	.40	1.91	32	47	17
Men—alone	65	6.83	.81	6.49	1.10	.34	2.00	22	57	15
Women—together	79	6.97	.80	6.40	1.37	.57	3.35	18	62	22
Women—alone	70	6.87	.89	5.92	1.34	.95	5.00	9	66	44
Wet men—together	95	3.92	.60	4.39	1.16	.47	2.77	16	49	18
Men—alone	90	3.91	.60	4.73	1.22	.82	5.86	9	64	26
Women—together	77	4.16	.60	5.04	1.33	.88	5.18	16	68	34
Women—alone	78	4.12	.67	5.02	1.10	.90	6.00	13	65	35
Dry heard men speakers—together	62	6.91	.87	6.34	1.36	.57	2.85	23	63	26
Heard women speakers—together	70	7.00	.73	6.57	1.29	.43	2.53	24	50	14
Heard men speakers—alone	69	6.96	.59	6.39	1.22	.57	3.55	22	51	25
Heard women speakers—alone	66	6.81	.77	5.99	1.32	.82	4.32	8	64	36
Wet heard men speakers—together	83	4.10	.58	4.85	1.33	.75	4.68	17	61	28
Heard women speakers—together	89	3.98	.51	4.54	1.15	.56	4.32	15	54	21
Heard men speakers—alone	86	3.98	.62	4.91	1.41	.93	5.82	7	64	31
Heard women speakers—alone	82	4.04	.65	4.81	1.15	.77	5.13	15	66	28
Dry men—heard men speakers	64	6.97	.64	6.68	1.11	.30	1.88	30	55	13
Men—heard women speakers	54	6.83	.71	6.34	1.22	.49	2.45	22	52	20
Women—heard men speakers	67	6.91	.65	6.08	1.32	.83	4.61	15	67	37
Women—heard women speakers	82	6.97	.71	6.24	1.45	.73	4.06	12	60	28
Wet men—heard men speakers	88	3.90	.63	4.55	1.26	.65	4.53	10	56	19
Men—heard women speakers	97	3.93	.58	4.55	1.09	.62	5.17	14	58	24
Women—heard men speakers	81	4.18	.60	5.21	1.41	1.03	6.06	14	70	41

suasive argument, he may expect to be more effective in the alone than in the group situation. These data give no indication that either type of argument is particularly more effective than the other in either social situation.

When the effects of logical versus persuasive speaking to men and women are considered it cannot be said that either sex is much more influenced by one type of speaking than the other. The direction of the trend of evidence seems to indicate that men as compared with women are somewhat more impressed by the logical and less impressed by the persuasive speeches. Although the logical speech to both dry men and women groups is more effective than the persuasive speech, in the men's groups it produces a noticeably greater effect than the persuasive speech, and in the women's groups it produces only a slightly greater effect. Likewise for the wet groups where we expect the persuasive speech to produce greater change, the women as a whole show considerably greater change in the persuasive than in the logical group and the difference for the men is slight. On the whole, however, the quality of the individual speech, regardless of type, seems to be a more important factor than the logical or persuasive nature of its type.

On the whole men and women seem to do equally well with the use of the two types of speeches. In the dry group both the men and women speakers produced almost exactly the same results with the two types of speeches. In the wet group the results with the persuasive speech were approximately the same. Likewise in Group I<sup>2</sup> the man and woman speaker produced about the same results with the logical speech given to wet subjects. In Group II the man did much better with the logical speech than did the woman speaker of that group and was also better than either the man or woman speaker of Group I. In fact this man got better results with the use of the logical speech than with the use of the persuasive speech. There seems to be no explanation for this phenomenon unless it is that he felt the speech to be a better speech and was more confident in its presentation. The greater results he accomplished with the logical speech account for the fact that the men as a group are seen by the data table to have had greater effect on the whole

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<sup>2</sup>The data on separate analysis of speakers for Groups I and II are not present in the table.

with the use of this speech. The trend of the data indicates that both men and women on the whole use both types of speeches with approximately equal effectiveness. The exception indicates, however, that one speaker with a poor speech may produce greater results than another speaker can produce with a much better speech.

In a study of the relative influences of the group and the face-to-face situations upon changes of attitude in men and women in Table 4, it appears that men are less influenced by the situation than women. On the average a slightly greater change is produced in the alone than in the together situation in both sex groups. There is relatively a much greater change in the alone situation for women's than for men's groups. In the dry group, in fact, the men make a slightly greater change in the audience situation. It would appear, then, that particularly in attempts to motivate changes of attitudes in women it is important to work with subjects individually. It may be that, if women are more sensitive to social stimulation than men, the presence of other auditors with attitudes which are negative to the direction of the appeal causes women to be more responsive to this negative social facilitation than men would be. On the other hand when only a speaker making a positive appeal is present in a room with them, the direction of the only social facilitation which exists is positive in nature, and therefore the response in a greater number of cases is positive.

The effects produced by the men speakers in the together and in the alone situations were approximately the same. Women speakers, however, produced much greater effects in the alone than they produced in the together situations. The men speakers uniformly produced better results in the together situation than the women produced in this situation, and women produced greater results in one of the alone situation groups, that is, in the dry group, and the men produced better results in the other alone situation group, that is, in the wet groups. The women speakers were slightly superior to men in the alone situation groups. Thus we see that where women speakers are used they may be expected to get best results when working with subjects individually, and where audiences are addressed men may be expected to get better results on the average than women are able to secure. Men speakers may be expected to do approximately as well in one situation as in the other; but where individual

solicitation is required, since women do much better in the alone than in the group situation, they may be expected to do somewhat better than men.

The last of the second order variables to be analyzed is one in which the relative effect of men and women speakers upon men and women subjects is compared. These data support conclusions which may be based upon differences which are greater than occur in most of the subvariables. Here we find that the men who heard a woman speaker made a greater change, and particularly it is noticeable that more individuals made a significant change, than did men who heard another man speaker. Likewise the women who heard a man showed a markedly greater change than did the women who heard another woman speak to them. These data seem particularly important for consideration where speakers are being selected for solicitation in groups that are homogeneous in sex.

#### IV. SUMMARY

1. A dual method of analysis was employed in the study of the data gathered in this experiment. In reporting in the group method, mean changes and figures on the difference over the standard deviation of the difference were reported for each group of subjects. In reporting in the individual method of analysis, the percentages of the members of each group who changed either in the direction of the argument or a counter direction more than one standard error of measurement were reported first. Then the percentage of the members of each group who changed more than three standard errors of measurement, or made a statistically significant individual change in a positive direction, were reported. Since only about one per cent of the total group made a negative change which was statistically significant these individuals are not reported separately from those making a slight negative change. This method of analysis enables a precise presentation of the type and extent of the change which occurs in a group, and provides a convenient and reliable method of comparing the results obtained in one project with those obtained in another.

2. The Smith-Thurstone Scale for the Measurement of Attitudes toward Prohibition was found not to be a very reliable scale for attitude measurement when only one form of the scale was used.



The Score received by subjects on Form B is considerably more dry than the score received on Form A. When both forms of the scale are used in each test, the mean score changes little and the test is found to be highly reliable.

3. Attitude scores for women on this test were found to be somewhat less reliable than scores for men.

4. The distribution of scores on the Smith-Thurstone Attitude Toward Prohibition Scale were bimodal, but skewed slightly in the direction of wetness. In the dry groups the women outnumbered the men five to four, in the wet groups the men outnumbered the women seven to six.

5. The mean change of attitude occurring in both dry and wet groups as a result of the argumentative appeals presented was statistically significant. The total amount of change occurring in the two groups was almost identical. These data indicate that it is possible to produce a statistically significant change of attitude in a group by presentation of an argumentative appeal.

6. Approximately 60 per cent of the members of the experimental groups made a positive change of attitude greater than one standard error of measurement, and about 25 per cent made a positive change of attitude greater than three standard errors of measurement on the attitude scale after hearing an argumentative speech. Three to four times as many individuals made a positive as made a negative change of attitude. The significant positive change of attitude in the experimental group was more than five times as great as the positive change which occurred in the control group.

7. Since a negative change of attitude occurred in only about half as many subjects in the experimental as in the control group, negative reaction occurred relatively infrequently as a result of hearing these speeches.

8. These argumentative appeals presented to groups which held relatively homogeneous negative attitudes to the appeals tended greatly to increase the dispersion of attitudes held by members of the groups.

9. Logical and persuasive speeches were equally effective in producing changes of attitude. The relative qualities of the speeches of the same type may have been more influential in producing varying amounts of change than were the various types of speeches. The

logical speech to dry subjects was more effective than the persuasive speech to dry subjects, and the persuasive speech to wet subjects was more effective than the logical speech to wet subjects. It is possible that characteristics of the subjects in these groups rather than relative qualities of the speeches was the cause of the relative effectiveness of the two types of arguments presented to subjects holding dry and wet attitudes.

10. Presenting the arguments to subjects in a face-to-face situation while alone in a room with the speaker produced greater change than presenting them to subjects while members of an audience. There was a greater amount of negative suggestibility in the group than in the alone situation.

11. Changes of attitude in women occurred to a greater extent and in greater numbers than occurred in the case of men subjects. About one-third of the women made a statistically significant change of attitude as compared with one-fifth of the men.

12. Men and women speakers produced attitude changes which were approximately equal. One of the eight speakers, a man, produced changes which were about one-third greater than the changes secured by the other seven speakers who used the same arguments.

13. There was relatively much less difference in the effect of the various speeches in the alone than in the together situation. Both logical and persuasive type arguments were more effective when the subjects were alone than when they were in an audience.

14. The trend of the evidence indicates that the men as compared with the women were somewhat more impressed by logical and less impressed by the persuasive argument.

15. Men and women speakers were approximately equal in the effectiveness with which they used the logical and persuasive arguments.

16. The alone situation seemed to produce relatively greater influence on women subjects than men, although both men and women on the whole were somewhat more influenced in the alone than in the audience situation.

17. Men speakers produced better results with audiences than did the women. Women speakers did much better in the face-to-face situation than they did with audiences, and were on the whole slightly superior to men in the alone situation. The men speakers produced almost as great a change in one situation as the other.

18. There was a greater change in groups of men who heard a woman speaker than in groups who heard a man speaker, and vice versa, there was a greater change in groups of women who heard a man speaker than in groups who heard a woman speaker.

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# DES ÉTUDES EXPÉRIMENTALES DES CHANGEMENTS D'ATTITUDES: I. UNE ÉTUDE DE L'EFFET DU RAISONNEMENT ORAL SUR LES CHANGEMENTS D'ATTITUDE

(Résumé)

On a fait cette étude dans le but de déterminer le degré auquel l'expression des attitudes à l'égard de la prohibition des boissons alcooliques pourrait être changée par le raisonnement oral dans de diverses conditions expérimentales. On a construit des arguments logiques et émotifs pour le pour et le contre de la question, et on les a validés quant au type. L'Echelle Smith-Thurstone a été employée dans le test et après la présentation des arguments dans le nouveau test. Les sujets expérimentaux ont été 607 étudiants universitaires. Un autre groupe de 300 étudiants universitaires a servi comme sujets de contrôle et ceux-ci n'ont écouté aucun argument. Les arguments ont produit un changement statistiquement significatif des attitudes des sujets expérimentaux. Vingt-cinq pour cent des sujets expérimentaux ont fait des changements individuels statistiquement significatifs, tandis que seulement cinq pour cent des sujets de contrôle ont fait ce changement. La suggestibilité négative s'est montrée rarement. Les deux types du raisonnement ont été également efficaces. Les sujets ont fait plus de changements seul avec une personne qui parlait que comme membres d'une assistance. Les femmes ont fait beaucoup plus de changements que les hommes. Les personnes qui présentaient les mêmes arguments n'ont pas obtenu le même degré de changement des attitudes. Les sujets et mâles et femelles ont fait beaucoup plus de changements quand les membres de l'autre sexe leur ont parlé que quand un membre du même sexe leur a parlé.

KNOWER

# EXPERIMENTELLE STUDIEN ÜBER DIE AENDERUNGEN DER ANSICHTEN: I. EIN STUDIUM ÜBER DIE WIRKUNG DES SPRACHLICHEN ARGUMENTS AUF DIE AENDERUNG DER ANSICHT

(Referat)

Der Zweck dieses Studiums war die Feststellung des Grades, zu welchem der Ausdruck der Ansichten über Prohibition durch sprachliches Argument unter verschiedenen experimentellen Umständen geändert werden könnte. Logische und emotionale Argumente von je zwanzig Minuten wurden für beide Seiten der Frage aufgestellt und bezüglich des Typs bestätigt. Die Smith-Thurstone-Skala wurde zum Prüfen verwandt und nach der darbietung des Arguments beim Wiederprüfen. Die Versuchspersonen waren 607 Universitätsstudenten. Noch 300 Universitätsstudenten dienten zur Kontrolle und hörten keine Argumente. Die Argumente riefen eine statistisch bedeutsame Aenderung der Ansichten bei den experimentellen Vpn. hervor. Fünfundzwanzig Prozent der experimentellen Vpn. machten statistisch bedeutsame individuelle Aenderungen, während nur fünf Prozent der Kontrollversuchspersonen eine solche Aenderung machten. Negative Suggestibilität kam selten vor. Die zwei Typen von Argument waren gleich wirksam. Die Vpn. änderten ihre Meinung zu einem grösseren



Grade, wenn sie allein mit einem Redenden zusammen waren, als wenn sie Mitglieder eines Publikums waren. Frauen änderten zu einem beträchtlich grösseren Grad ihrer Meinungen als die Männer Redende, die dieselben Argumente gebrauchten, unterschieden sich in ihrer Wirksamkeit zur Erlangung Aenderungen der Ansichten. Sowohl Männer als auch Frauen änderten ihre Meinung zu einem grösseren Grad, wenn sie die Argumente von einem Mitglied des anderen Geschlechts, als wenn sie sie von einem des eignen Geschlechts hörten.

KNOWER

## IS TRUTH INDIVIDUAL OR SOCIAL?\*

*From the Department of Psychology of Smith College*

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W. S. TAYLOR

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"The world has been purged from ignorance with the blood of those that have enlightened it"; and the fruits of independent thinking have gone often to the descendants of those who persecuted the thinkers. Such must be the cost of progress, until the people see that our knowledge is a growth, and that individual thinkers, not cults or classes, are the actual growers.

That truth, as we know it, is a growth subject to change and to individual judgment follows from history and from logic. Excepting perhaps the "formal" or "necessary" truths of mathematics and logic, our generalizations, when not merely habitual or forced by social pressure, are necessarily hypotheses; our empirical facts, similarly, are only well-established hypotheses; and hypotheses, as the logician knows, are incapable of absolute proof. Even "formal truths" are uncertain, in practice, because of the difficulties, first, of knowing just what is implied within each statement given; and second, of proving the applicability of any given statement to a given case (5, p. 141; 10, pp. 67-70, 482-495, 539 ff.; 23, pp. 34-36). And, whether dealing with hypotheses or with "formal truths," all men, either as judges or merely as judges of judges, are limited completely to individual judgments.

Men will always wish to get beyond individual judgments; but they can never do more than improve the judgment of given individuals, or substitute for it the judgment of other individuals. If some individuals profess to find truth through an inner feeling or illumination, others can show that many persons are not aware of such illumination, and that many who are interpret it differently, or change their interpretations upon further experience. If individuals appeal to the various theories and tests of truth, the answers they gain from those sources will yet remain subject to individual judg-

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ment. If the inquirers resort to objective test, that test will prove objective for only such individuals as judge it to be objective. If, finally, any individual appeals to authority for his truth, we must note that different individuals have different authorities, the same individual may have different authorities at different times, and each authority's views are likely to change and in any event, an authority can be an individual's authority only by grace of the individual's judgment.

Practically speaking, therefore, "truth" is like "good taste"; and "good taste," as Ducasse says, "means either my taste, or the taste of people who are to my taste, or the taste of people to whose taste I want to be. There is no objective test of the goodness or badness of taste, in the sense in which there is an objective test of the goodness or badness of a person's judgment concerning, let us say, the fitness of a given tool to a given task" (8, p. 285).<sup>1</sup>

Even the fitness of the tool to the task, we should add, can be judged "objectively" only through reference to our *most fundamental individual experience*, direct or projected; namely, to pain, touch, and sight. The worker *sees* and "*feels*" that the tool works well, that it turns out a satisfactory product, as painlessly as possible, in a given time. (A blind worker would rely on pain and touch.) Of course the worker uses his other senses too; but pain, touch, and sight are more "objective" than other senses only because they are more dependable, and more at one with others' experiences. Yet because the worker may be mistaken, or insane, it is customary to submit the tool to the fundamental experience of *influential individuals*—experts, dictators, or a dominant public; who in turn may be wrong, for a time at least.

At this point the question arises, if it has not arisen already, Why single out the individual? Is not society much more real, or at any rate, more important, than individuals? Or if the individual is to be put above society, should not the single organ, the cell, or even the atom, be put above the individual organism, as the bar of truth?

Certainly every human individual is constituted largely by his society, without which he would not be what he is. Certainly, too,

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<sup>1</sup>Cf. also Ducasse' statement that "the truth of a proposition is relative to the specification of . . . three things—standard, method, and observer" (7, pp. 597, 588).

On individuality in moral judgment, cf. Jones (13-16).

every individual is constituted largely of cells and atoms, without which he could not exist here. Also, society, individual, and organ and cell alike are changed by changing either their components or their arrangements of components; these changes usually affect the other or all components in turn. Society, we must admit, is more or less organized, like an individual organism, with structures, functions, and patterns; while at the other end of the scale some organization appears in organs and in parts of organs. Even the effort to distinguish between society and individual organism in terms of integrative neurophysical structure falls short, as Münsterberg showed. Correspondent to the individual's nerve cells and connecting fibers are society's individual brains and their connections, natural and invented. Between individual persons there are, it is true, spaces and freedom of movement; yet we do not know that the neural and muscular elements in the body are mechanically continuous. Indeed, modern researches show that neural elements, at least, are not always fixed in function but shift rôles within response patterns, just as individuals take over one another's work in society. The distinction between organism and organ in terms of the self-sufficiency of the organism likewise breaks down, when we consider that many organs, and parts of organs, can live by themselves under favorable conditions; just as, we are reminded, the human organism can survive apart from society under only the most favorable conditions. Thus every distinction between society, individual organism, and organ, in terms of organization, becomes a relative distinction.<sup>2</sup>

Distinctions, further, in terms of function with respect to truth appear more or less relative. Not only individuals but societies do much to determine what shall be thought true and what untrue. Individuals have discovered truth (meaning here what is accepted as truth); but so, it might seem, have societies. Individuals have stimulated others to find truth; and individuals have been stimulated in turn by the promptings of society. Individuals have sought to communicate truth; but they have also received truth from social teachings. Individuals have been martyrs to truth; so have societies. Individuals have synthesized new truths from old contradictions; and

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<sup>2</sup>The essential similarity of individual to society is considered, positively, by Münsterberg (18, pp. 266-269); negatively, by Allport (1, pp. 1-13); and relatively, with important qualifications suggested below, by Perry (19). Cf., further, Allport (2).

societies might appear to have done the same. Individuals have tested truth individually; while societies perhaps seem to have tested truth through social survival, often with the deaths of deluded individuals. Because of the greater bulk and endurance of society, and of the wealth of forces which play there, we could easily think of society as the developing-ground and the final judgment-seat for truth.

At the other extreme, similarly, our suggested analysis of "objective test" as test by the "fundamental experience" of individuals might be thought applicable further. Individuals react favorably to propositions only when component functional elements of the same individuals are reacting favorably. (This does not mean the majority of functional elements; neither does it imply neuro-anatomical fixity of elements. It means determinative elements in functional, not structural, patterns.) These functional components frequently work into new patterns of truth-discovery; arouse other components to work into such patterns; are suppressed, like martyrs, by dominant other components; synthesize with components of conflicting patterns to produce new "truth" responses; and, in short, may seem to provide the elemental play through which individuals' and societies' truths evolve.

Why, then, should we refer truth to individual organisms, instead of to society or to components of individuals, when society, individual, and component are markedly similar in structure and function? Must not any choice between these three grades of existence be a choice merely of purpose or point of view?

In a sense, yes; in the last analysis, every definition expresses purpose or point of view. But there are significant differences, for us, between society, individual, and component: differences which "fundamental experience" thoroughly approves.

To begin with, individuals, though constituted largely of social inheritance, and with difficulty living apart from society, nevertheless can live apart, spatially, culturally, or both; whereas society could not exist apart from its members. And while individuals could not exist apart from their components, their components are not so likely to exist apart from individuals as these are from society. Furthermore, component responses, though essential to every decision about truth, are yet not decisions about truth, but remain component responses, and are responses not to truth but to mere stimuli. A



response component, or for that matter a single organ, existing by itself under favorable conditions, could not be said to possess truth; whereas a single individual could possess truth in isolation from all society.

At the opposite end of the scale, society, as Perry has remarked, may "own the national forests, or claim cablerights on the Island of Yap"; yet society does not "study Einstein," and "it is fairly clear that you cannot divide a syllogism between three men having the first think the major premise, the second the minor premise, and the third the conclusion. The links that unite men into groups, many and strong though they be, do not seem to be refined enough to guide a train of reasoning." Truth, in other words, is something which can be enjoyed as such by individuals, and not by mere components of individuals or by society; because with respect to truth perception, components and societies alike are incompetent as compared with individuals, who alone, so far as we know, can experience the unity and satisfactoriness which mark the truth of any proposition. Individuals are naturally the arbiters of truth.<sup>3</sup>

This does not mean that there are no acceptable truths. Happily, there are many such truths. "Two and two are four" is one; "The

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<sup>3</sup>"The ultimate evidence of truth is the compulsion of a belief" (9, p. 190).

Perry's analysis makes "the social whole" not "more than a man, a super-man," but "a more primitive whole, resembling the plant or the infra-human animals" (19, pp. 730 ff. The quotations are from pp. 732, 733, 730).

Of course one could argue metaphysically, after Leibniz and Fechner, that society *can* have a Social Mind, with a truth-consciousness which we, as individuals, do not know; just as an individual person has a total consciousness which, we must suppose, his several cells and response components can not know. From the "relativity of organization" of society, individual, and component, outlined above, we must indeed acknowledge that a Social Mind is possible, just as we must acknowledge that some sort of Mind of the universe, or, for that matter, of a single cell, and of every grouping of cells, is possible. But to say that such a Mind is possible is all that we can say. Even if an individual could get an introspective hold on a Social Mind, or could find evidence of its decisions, the interpretation of such knowledge, or evidence, would remain an individual matter, to be dealt with by individuals.

Incidentally, too, we must acknowledge that if concept, judgment, and truth are conceived as linguistic, truth is more easily taken to be social and not individual than if these phenomena are thought separable from language. We should remark, therefore, that we have no proof for, and much evidence against, the view that concept, judgment, and truth rest on language, that language is necessary to thinking; and in any event, so far as we know, only individuals *use* language, *have* concepts, judgments, and truths, and *make* truth-judgments.

sun is a source of light" is another; "Kindness is good" is a third. But there are differences between accepting such truths unreasonably and accepting them reasonably. It is unreasonable to accept them as established for all time, without qualification: it is reasonable to accept them confidently for only so far as they seem trustworthy. It is unreasonable, again, to take truths upon an authority supported merely by force, convention, or orthodoxy: under many circumstances it is reasonable to take truths upon any authority, such as expert counsel, which stands as a potential guide to individual tests. The former sort of authority, we may add, has no right to exist. Having lost whatever rootage in test it may have had in the past, it is parasitic now upon its submissive followers, depriving them, as Mill showed, of any real enjoyment of its truth, as well as of adequate defense against what error it may contain (17). The other sort of authority, that of potential individual test, has every right to exist, to enrich modern life.

Nor does this view mean anarchy. An insane person, who believes his fellow men are shadows, and acts upon this belief, will be restrained by his fellow men's counter-beliefs expressed in group action, according to the dictates of their fundamental experience. An individual who decides that other men have no rights to their property, to their tastes, or to quiet, and attempts to deprive them of these goods, will be treated like the insane person, unless he can persuade the others that he is right, or they can persuade him. Just as in the mental processes of the individual no proposition can hold out against nature's *argumentum ad baculum* through his "fundamental experience," so in the life of the group, the lone individual must often yield to the social *argumentum ad baculum* which expresses the dominant party's individual judgments. Furthermore, physical force as a means to social decision must wane and social harmony grow as individuals, free to express their thoughts, understand one another and find common interests, including altruistic interests (6, p. 247 *circa* 22, Parts III-V; 20, pp. 65-91).

The present view implies, for every individual, maximal freedom to think, to speak, and to publish, so long as he does not directly interfere with the rights of others, including their right to the same freedom. Some would subscribe to this principle "except in time of war or national emergency"—a qualification which only calls attention to the facts, first, that there is always something of a na-

tional emergency; and second, that in every time, the freedom allowed to individuals will in fact be determined by the method remarked above, namely, by the dominant party's individual judgments as to what can safely be tolerated. Naturally such judgments will change as the dominant individuals learn that in addition to their need for united action they need new ideas, criticisms of old ideas, freedom of thought and expression, for social health and growth; that in all times the safest principle is to allow freedom for any expression that does not directly endanger public safety or incite to illegal action (4, pp. 333-354, 437-477; 21, Ch. 20; 3, pp. 36-38).

In fine, individuals discover truth, often through interaction with other individuals; individuals hold truth, communicate it, and receive and understand it, as best they can; and when they take truth "on authority," apart from compulsion, the authority is their authority only by grace of their individual judgments.

This view, instead of subverting science and morality, seems rather to encourage the individual inquirer to contribute, singly or co-operatively, to the common life.<sup>4</sup>

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<sup>4</sup>Jerusalem shows that "the periods in history in which the development of individualism was much in evidence were likewise characterized by the exact investigation of facts" (12, p. 418).

He explains this relation through "social differentiation and the resulting development of self-reliant personalities" out of primitive society with its "collective ideas" (Durkheim) or "social crystallizations." Jerusalem concludes however that "the real criteria of truth are not the subjective feeling of evidence" but "universal and tested experience" as socially crystallized (12, pp. 422, 408, 412, 429). For the present view "social crystallization" appears as a great source and practical result of "the [ultimately] subjective feeling of evidence" which rests with individuals, often with influential individuals and majorities.

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## LA VÉRITÉ EST-ELLE INDIVIDUELLE OU SOCIALE?

(Résumé)

Il suit de l'histoire et de la logique que la vérité, comme nous la connaissons, est une croissance sujette au changement, et est le résultat, dans la dernière analyse, du jugement individuel. Même "le test objectif de la vérité" se réduit au test par "l'expérience fondamentale individuelle," c'est-à-dire, la douleur, le toucher, et la vision. Ni le groupe social, de l'un côté, ni un composant quelconque de l'individu, tel que l'organe ou la cellule, de l'autre côté, ne peuvent être ainsi fondamentaux à la vérité; parce que, malgré les similarités entre les organisations de l'individu, de la société, et des composants de l'individu, respectivement, il y a des différences importantes. Les individus peuvent vivre en dehors de la société, comme la société ne peut pas vivre et comme les composants de l'individu peuvent

rarement vivre en dehors des individus eux-mêmes; les composants des individus, bien qu'essentiels au développement de la vérité, ne sont pas encore ceux qui tiennent la vérité; et la société en elle-même ne peut voir et jouir de la vérité. Cette vue permet les vérités acceptables, en effet, les vérités socialement acceptables, pourvu que leur test définitif soit admis comme individuel; et la vue permet l'organisation collective, la "décision," et l'action; car la vue donne à entendre et la liberté intellectuelle pour les individus, et l'intérêt individuel dans les intérêts communs.

TAYLOR

## IST DIE WAHRHEIT INDIVIDUELL ODER SOZIAL?

(Referat)

Dass die Wahrheit, wie wir sie kennen, eine Entwicklung ist, die Veränderung ausgesetzt ist, folgt aus der Geschichte und der Logik. Sogar der "objective Prüfstein der Wahrheit" lässt sich auf den Prüfstein der "individuellen Grunderfahrung" zurückführen, d.h. Schmerz, Tast, und Gesicht. Weder die soziale Gruppe einerseits, noch irgendeine Komponente des Individuums, wie ein Organ oder eine Zelle, andererseits kann die Grundlage der Wahrheit sein, weil es trotz den Ähnlichkeiten zwischen dem Aufbau des Individuums, der Gesellschaft und der Komponenten des Individuums wichtige Unterschiede gibt. Individuen können von der Gesellschaft getrennt leben, wie die Gesellschaft nicht leben kann, und wie die Komponenten des Individuums selten von den Individuen selbst getrennt leben können; Komponenten der Individuen, obgleich sie zur Entwicklung der Wahrheit wesentlich sind, sind nicht die Besitzerinnen der Wahrheit; auch kann die Gesellschaft für sich die Wahrheit nicht wahrnehmen und genießen. Diese Ansicht gestattet natürlich annehmbare Wahrheiten, ja sozial annehmbare Wahrheiten, insofern ihr Urmerkmal anerkanntermassen individuell ist; und die Ansicht gestattet Gruppenaufbau, "Entschluss," und Tätigkeit; denn die Ansicht schliesst in sich sowohl die intellektuelle Freiheit für die Einzelwesen als auch individuelles Interesse an gemeinsamen Interessen.

TAYLOR



# THE CONCEPT OF ECONOMIC SECURITY AMONG PRIMITIVE PEOPLES\*

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The concept of economic security in man no doubt rests upon a psychological as well as a biological basis. The biological basis of this concept has as its main supporting structure the Darwinian theory of evolution, emphasizing the survival of the fittest, the precedence of the superior over the inferior, and the fundamental drives or animal appetites, however these may be classified. Indeed a drive to achieve and maintain a sense of security might plausibly be assumed as one of the bases of the mechanisms which we call by the various names of drives, instincts, impulses, and appetites. An awareness of security is probably a very primitive element of life which bears the same relation to the concept of security as the senses of space and time bear to their respective concepts.

There seems no reason why psychologists should not recognize a general *sense of security* as a more or less developed primitive character of life at every level of organic development, a character arising in the first place out of the purely physical conditions of equilibrium. The sense of security then would be in the first place a kind of organic resonance and psychic sign corresponding to the preservation of a satisfying balance of organismic forces. It would be the psychic counterpart of what Cannon calls *homeostasis* (4, p. 24) or balance of regulatory activities. In the animal world this sense of security may well be described as economic, since it is entirely a function of the adaptive distribution and conservation of the animal energies—a purely economic task. When a certain degree of regulation of the *external world* is added to the inner homeostasis, the sense of security *expands* to include the latter. With the advent of man characterized by a much larger and better organized brain than any animal possesses, and a social state of rapidly increasing complexity,

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the general sense of security, differentiated into a number of modes, corresponds to the several grand spheres of interests and relationships set up in the physical and social environment. We may accept Spranger's (15) divisions of economic, theoretical, aesthetic, political, social, and religious as a fairly exhaustive list of the social spheres,<sup>1</sup> characterized by individual human types, systems of motivation, and, we might add, modes of the sense or feeling of security. These modes, however, are all outgrowths of the original feeling of economic security leading to many additional mechanisms to attain the one great economic end of survival. It is at this stage that the concept of economic security, as distinct from the mere sense, feeling, or awareness, may be said to have been born, behavioristically rather than by the conscious steps of concept formation described in treatises on formal logic (1, p. 302). This behavioristic concept of security represented an implicit plan of action to maintain the feeling on which it was based. It is really a later stage of homeostasis. Man acted as if economic security was his principal and final aim before he formulated the concept consciously. Indeed it remained for the nineteenth century and Karl Marx to do that.

Even for the formation of the behavioristic concept of security to arise, it was necessary for the original sense of security to differentiate into several types of security feeling, appropriate to Spranger's social spheres.

Out of the several senses or types of security evolved the concepts, first, of economic, later in the history of civilization, of political, aesthetic, and theoretic security, probably in the order named; but the relation of each to the prior concept of economic security may be traced.

Thus, hunting, fishing, and primitive work of all kinds are abundant and laborious, and it is all plainly in the interest of a sense of economic security. Magical and scientific or theoretic activity, if we may call the crude empiricism of savages the beginnings of science, may in time create the need for scientific certitude or sense of theoretic security which a modern scientist, such as Darwin or Einstein, demands. But at first the purpose is to further economic security by multiplying or obtaining edible objects. The same is true

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<sup>1</sup>Some might add the sphere of moral or ethical relationships.

of early art, and in fact of all early effort. We believe that the concept of economic security is the father of all kinds of security awareness which we seek in modern life. In the following paper we wish merely to offer a few concrete illustrations which could be multiplied almost *ad libitum*.

Granting the truth of the above statements, one cannot say that man, even primitive man, in his striving for existence has been dominated wholly by biological appetites and drives. For to do so would imply that the human organism is devoid of a rational mind. Furthermore, if this were the case, our institutions which have been perpetuated and improved upon through the centuries would long since have vanished into oblivion; though some might urge that even institutions evolved by natural selection of favorable but blind variations.

In an excellent treatise on "The Psychological Basis of Social Economics," Ward calls for a strict demarcation of economics in the following phraseology—

There are two distinct kinds of economics; biological economics and psychological economics, the economics of life and the economics of mind. That is to say, there are two kinds of economy which it is of the first importance sharply to contrast, the economy that prevails in the animal world, in the domain of life, in organic nature generally, and the economy that prevails in the human sphere, in the realm of mind, in the domain of reason. (17)

From the foregoing paragraphs it follows logically that rational man is endowed with a certain amount of insight and foresight in the economics of life. It is not presumptuous in the least to assume that mankind has always had and further developed a concept of economic security through the ages which has a firm psychological basis, as is well illustrated by such institutions and modes of life as magic, religion, art, government and politics, as well as in his more direct economic activities (hunting, fishing, herding, and agriculture). It is the purpose of the writers of this paper to show how two of these institutions, namely religion and family life, bear directly upon the psychological concept of economic security. These will be discussed in the order presented in the above statement.

Magic and religion are closely allied in primitive society and, if

Frazer is correct, magic slightly precedes religion in cultural development. Now many authorities agree that the earliest evidence of magic is found in the prehistoric paintings of animals in the dark recesses of caves inhabited by people of the Paleolithic stage of culture (2, pp. 22-247). The animals painted on darkened walls serve no aesthetic need; they are depicted as wounded; and they are invariably of supreme economic importance, inasmuch as they were sources of food, clothing, and shelter. So the earliest magico-aesthetic efforts were really to promote the economic security of the group.

Religion offers many profuse examples and illustrations of the quest for economic security through the ages. In speaking of animism, Tylor states that:

Spiritual beings are held to effect or to control the events of the material world, and man's life here and hereafter; and it being considered that they hold intercourse with men, and receive pleasure or displeasure from human actions, the belief in their existence leads naturally and it might almost be said inevitably, sooner or later to active reverence or propitiation. (16, p. 636)

The same author in a later paragraph emphatically expresses himself as to the development of animism:

Endeavoring to shape the materials for an enquiry hitherto strangely undervalued and neglected, it will now be my task to bring as clearly as may be into view the fundamental animism of the lower races, and in some slight and broken outline to trace its course into higher regions of civilization. Here let me state once for all, two principal conditions under which the present research is carried on. First, as to the religious doctrines and practices examined, these are treated as belonging to theological systems, *devised by human reason without supernatural aid or revelation*; in other words as being developments of natural religion. (16, p. 637)

It would thus appear from the very outset according to this authority that man was endowed with a rational mind which devised religious doctrines and practices which in turn controlled material events as well as the life hereafter. The difference in the present age would seem to be a matter of degree and not of kind. Indeed it is not hard to understand the relationship of these fundamental attitudes with the concept of economic security.

In primitive society magical and mystical beliefs are most invariably interwoven with those of religion. Clodd in speaking of stones to which celestial origin has been assigned states that:

They were known to both Greeks and Romans, as they are to the Indians of Nicaragua, as thunderbolts; the Germans and the Scandinavians called them Thor's hammers, and both among them and other European peoples they were credited with miraculous powers in healing the sick and warding off the dire effects of the evil eye. The natives of the Gold Coast when finding them on the ground after heavy rains have washed them out of the soil, and used them as medicine by scraping the dust from them into the water, and laying them in places sacred to the gods. (5, p. 89)

Schultze's treatment of Fetichism (13) lists a variety of objects, cherished because of their supposed role in promoting the economic security of their possessors.

Besides, stones, mountains, bodies of water, such as African and American rivers, and the holy wells of Ireland, fire, wind, thunder, and lightning, clouds and rain serve as guarantees of security in various parts of the world.

In the interment of the dead are vivid examples of the attention paid to the deceased, so his spirit would approve and do his people no harm in the material world.

The belief that the dead man still required the necessities of life made the supply of these a solemn duty, and while piety and sympathy aided the discharge of this, prudence prompted care that no neglect should offend those who perchance had acquired new power to help or harm the living. (13, p. 108)

Not only was mankind accorded mystical powers upon death, but also various forms of plant and animal life. Tylor assures us that:

The Dayaks of Borneo not only consider men and animals to have a spirit or living principle, whose departure from the body causes sickness and eventually death, but they also give to the rice its "samangat padi" or "spirit of the paddy", and they hold feasts to retain the soul securely, lest the crop should decay. (16, p. 652)

In the Pacific region the conception of Mana plays an all important rôle in the lives of the people. It is conceived of as a force



distinct from the physical which may bring either good or evil to people. On the powers ascribed to Mana by the Melanesians and Polynesians, Marett, quoting Codrington, enlightens us with the following statements:

If a man's pigs multiply, and his gardens are productive, it is not because he is industrious and looks after his property, but because of the stones full of Mana for the pigs and yams that he possesses. Of course a yam naturally grows when planted, that is well known, but it will not be very large unless Mana comes into play; a canal will not be swift unless Mana be brought to bear upon it, a net will not catch many fish, nor an arrow inflict a mortal wound. (12, p. 663)

An analogous conception (Wakonda) plays a similar role in the thought of many American Indians.<sup>2</sup>

The widespread practice of Totemism, which may be viewed as both a religion and a form of social organization, is obviously a means of attaining economic security. As Frazer shows, a totem is a class of animals or plants, rarely a class of inanimate natural objects; and occasionally a class of artificial objects, which are revered by a group of people who claim descent from it, hence a blood kinship. (7)

Most totems are animals and these are generally of economic importance, if not to the totemist, to a neighboring friendly group whose totem in turn may be of economic importance to the first. The practice of Australian tribes in magically multiplying their totems for mutual use as food is an illustration. (8, Ch. 5)

The citations thus far have in no small measure illustrated the importance of religious beliefs and practices in the domination of the economic life and security of primitive people. It must be borne in mind that these practices and beliefs were products of the rational primitive mind of the period.

A very interesting aspect of the part primitive woman plays in religion and the due economic disaster and consequences which might prevail if she did not abide by the religious beliefs and practices of her tribe deserve mention here:

Among the Ila, a Bantu tribe of Rhodesia, a woman during

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<sup>2</sup>See Hewitt (9) on the Orenda of the Iroquois, corresponding to Moroccan Baraka and the Hasina of Madagascar.

her periodic illness is dangerous and must be separated as far as possible from contact with her fellows. A man eating with her would lose his virility, and sick people would be most injuriously affected by her. (10, p. 212)

It appears that in almost all primitive tribes menstruating women as well as adolescent girls were looked upon with extreme disfavour, because of their ascribed abilities to seriously hamper the economic life of their tribe, and this attitude survives in superstitions among contemporary rural populations, in civilized countries.

In a subsequent paragraph, Lowie, in speaking of the adollescing Chinook girl, points out that:

In subsequent catamenial periods she must not be seen by a sick person nor must berries picked by her be eaten by the sick. (10, p. 214)

In this same paragraph Lowie, quoting Father Morice on the menstruating women of the Northern Athabaskans, states that:

Hardly any other being was the object of so much dread as a menstruating woman, who ate only dried fish, drank water through a tube, and was not allowed to live with her male kin nor to touch anything belonging to men or related to the chase lest she should pollute the same, and condemn the hunters to failure, owing to the anger of the game thus sighted. (10, p. 215)

The genius of the primitive mind in the economic life of the family is no doubt best portrayed by the marriage relationships that are found among the various tribes.

Probably the best exposition of the sound economic basis of primitive marriage is that given by Lubbock on the three forms of matrimony in Sumatra.

In Sumatra there were formerly three perfectly distinct kinds of marriage; the "Jugur", in which the man purchased the woman; the "Ambel-anek", in which the woman purchased the man; and the "Semando", in which they joined on terms of equality. In the mode of marriage by Ambel-anek, says Marsden, the father of a virgin makes a choice of some young man for her husband generally from an inferior family, which renounces all further right to, or interest in, him; and he is taken into the house of his father-in-law, who kills a buffalo on the

occasion, and receives twenty dollars from his son's relations. After this, the "buruk baik" nia (the good and bad of him) is invested in the wife's family. If he murders or robs, they pay the "bangun" or fine. If he is murdered they receive the "bangun." They are liable to any debts he may contract in marriage; those prior to it remaining with his parents. He lives in the family, in a state between that of a son and a debtor. He partakes as a son of what the house affords, but has no property in himself. His rice plantation, the produce of his pepper garden, with everything that he can gain or earn belongs to the family. He is liable to be divorced at their pleasure, and though he has children, must leave all and return naked as he came.

In the Jugur marriage the woman becomes the property of the man.

The Semando is a regular treaty between the parties on the footing of equality. The adat paid to the girl's friends has usually been twelve dollars. The agreement stipulates that all effects, gains or earnings are to be equally the property of both; and in case of divorce by mutual consent, the stocks, debits and credits are equally divided. (11, p. 75)

One could hardly be convinced after reading the above citation that the primitive mind was not endowed with a keenness and sagacity which would rival that of the modern business man.

The natives of Ceylon long anticipated the so-called modern trial marriage and free love advocates for we have it on reliable authority that:

In Ceylon there were two kinds of marriage—the Deega marriage, and the Beena marriage. In the former the woman went to the husband's hut; in the latter the man transferred himself to that of the woman. Moreover, according to Davy, marriages in Ceylon were provisional for the first fortnight, at the expiration of which period they were either annulled or confirmed. (11, p. 76)

It is evident that a sound economic principle underlies the trial marriages of primitives. In comparatively small primitive groups, which may be rapidly decimated by disease or war, and where all must work to survive, it is essential that none of the energies of individuals should be wasted in marriage relationships which reduce the efficiency of the individuals concerned or may fail to pro-

duce offspring. The parties separate to form new unions if possible, such procedure being most conducive to the economic security of the group. In modern overpopulated states, equipped with a mechanical technique for economic security, true marriages must find other grounds for justification.

That the family life was well planned and directed to assure their maximum unity and welfare is well attested to by a quotation from Clodd:

The collection of families into "gentes" or bands of "blood brothers" must have taken place at a very early period. At the bottom of the scale it was never wholly the selfish code—"each for himself, and let the devil take the hindmost." Among the men of the river drift and the Cavern, the interests of the family made for unity, and subordinated its welfare to that of the gens. (5, p. 155)

Primitive minds in spite of many popular misconceptions were very much aware of the strength to be found in unity and concerted action; moreover, they were well-versed in values of public enterprise and cooperation, which is well evidenced by the fact that in agricultural groups "the labour of clearing the ground for cultivation was shared by the village community; aided by the slaves, and therefore at the very outset public property." (5, p. 156)

At still earlier stages of culture, herding, hunting, and fishing tend to be communal where population is not too sparse, examples being the communal hunting of the Baganda, described by Goldenweiser (8) and the collective buffalo hunts of the Plains Indians, or the collective salmon fishing of the North West Coast Indians. A modern ethnologist, Speck (14), in a study of the Labrador Indians, finds in them a perfect example of a natural utilitarianism and primitive communism, in which the individual without tribal coercion subordinates his interests to those of group welfare. This primitive communism, no doubt, represents the effort of the individual to realize economic security through a solidarity with the whole.

In conclusion it can no doubt be safely assumed that primitive man felt a fundamental need of security and that, with his rational mentality, he devised institutions which although somewhat elaborated on in this present day and age have to no small degree retained

their main outlines, while some of his social inventions bid fair to return to the modern world as a somewhat drastic remedy for the evils of economic individualism and its increasing burden of insecurity to the individual.

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## LE CONCEPT DE LA SÉCURITÉ ÉCONOMIQUE CHEZ LES PEUPLES PRIMITIFS

(Résumé)

Le concept de la sécurité économique chez l'homme repose sans doute sur une base psychologique ainsi que sur une base biologique, dont la dernière reçoit l'importance principale dans la Théorie de l'Évolution de Darwin. La recherche de la sécurité est probablement un composant fondamental des instincts, des impulsions, et des élans.

Un sens général de sécurité est vraisemblablement un trait primitif de la vie—lequel sort des conditions physiques de l'équilibre comme la partie physique correspondante de l'activité "homostatique." Cette connaissance de la sécurité peut être tracée phylogénétiquement dans les animaux inférieurs où le besoin est seulement économique et la form implicite ou action est behaviouriste. Aux niveaux supérieurs, cette connaissance s'élève à un "Concept de Sécurité" qui est sciemment formulé et pourrait bien être illustré par les types Théorique, Esthétique, Politique, Religieux, et Social de Spranger, dont chacun a à sa base le sentiment de sécurité.

Dans la Société Primitive, la magie et la religion offrent grand nombre d'illustrations du rôle et de l'importance de la Sécurité Economique. Parmi ce grand nombre d'illustrations sont la multiplication des objets comestibles, le rituel totémiste pour accroître les animaux totems des tribus voisines, l'enterrement des morts avec de la nourriture, l'action d'éviter les femmes qui sont en train d'avoir leurs règles, la conception du mana et le système du mariage en Sumatra, dont toutes indiquent des efforts définis pour obtenir la sécurité économique.

Le communisme primitif dans la chasse, la pêche, ainsi que dans le défrichement de la terre, semble être encore une étape où l'individu subordonne son bien-être à celui du groupe pour un sentiment plus satisfaisant de Sécurité. On peut voir une analogie de ce rôle dans la transition qui se trouve dans les formes modernes du gouvernement.

DISERENS ET WOOD

## DER BEGRIFF VON WIRTSCHAFTLICHER SICHERHEIT UNTER PRIMITIVEN VÖLKERN

(Referat)

Der Begriff der wirtschaftlicher Sicherheit beim Menschen beruht zweifellos auf sowohl einer psychologischen wie biologischen Basis, die letztere wird von der Darwinschen Abstammungslehre betont. Ein Streben nach Sicherheit ist wohl ein Grundbestandteil der Instinkte und Antriebe.

Ein allgemeines Gefühl der Sicherheit ist am wahrscheinlichsten eine primitive Eigenschaft des Lebens, die aus physischen Zuständen des Gleichgewichts als das seelische Gegenstück der "homeostatischen" Tätigkeit entsteht. Dieses Bewusstsein der Sicherheit kann phylogenetisch auf die niedrigen Tiere zurückgeführt werden, wo das Bedürfniss rein wirtschaftlich ist und wo die implizite Gestaltung oder Tätigkeit das Verhalten (behavioristic) ist. Auf höheren Schichten vergrößert sich dieses Bewusstsein zu dem "Begriff der Sicherheit," der bewusst formuliert und durch Sprangers theoretische, ästhetische, politische, religiöse, und soziale Typen erläutert wird, deren jeder im Grunde sein Gefühl der Sicherheit hat.

In der primitiven Gesellschaft bieten Magie und Religion eine Fülle von Beispielen der Rolle und Bedeutung der ökonomischen Sicherheit. Unter diesen Vielen Beispielen befinden sich die Vervielfältigung der essbaren Gegenstände, das Totemritual zur Vermehrung der Totemtiere von benachbarten Stämmen, die Begrabung der Toten mit Nahrungsmitteln, die Vermeidung von menstruierenden Frauen, der Begriff von Mana und das Ehesystem in Sumatra, all dies weist auf ein bestimmtes Streben nach ökonomischer Sicherheit hin.

Der primitive Kommunismus beim Jagen, Fischen, sowie bei der Bodenräumung scheint ein Schritt auf dem Wege zu sein, wodurch das Individuum sein Wohl dem der Gruppe unterordnet, um ein vollständigeres Gefühl der Sicherheit zu haben. Eine Analogie zu dieser Rolle kann bei dem Uebergang der modernen Formen der Regierung beobachtet werden.

DISERENS UND WOOD

# SHORT ARTICLES AND NOTES

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## MEASURING COMPLEX ATTITUDES\*

PAUL HORST

The research initiated by Thurstone in the field of attitude measurement has aroused much interest and activity among social scientists during the past few years. Presumably one of the reasons social scientists are interested in measuring attitudes is their belief that a relationship exists between attitudes and conduct. If unfavorable attitudes can be discovered it may be possible to change these attitudes to some which are more socially desirable and thereby to influence conduct favorably.

The first step in constructing an attitude scale is to decide what attitude shall be measured. This may be an attitude toward war, or birth control, or any other issue or subject whatever. After the issue toward which the attitudes are to be measured has been determined, a number of statements are collected, each of which implies an attitude toward the issue. The attitude implied by a statement may be very favorable or very unfavorable toward the issue, or it may represent any intermediate gradation. Thurstone's principal contribution to attitude measurement has been the techniques which he has developed for determining numerically the extent to which a statement expresses a favorable or unfavorable attitude toward a given issue. The numerical value of a statement is called its scale value on the attitude continuum. A person whose attitude is to be measured simply checks each statement in the series with which he agrees. His attitude score is then a function of the scale values of the statements which he has checked.

Most of the attitude scales developed during the past few years have been constructed to measure attitudes toward issues of social, religious, or political significance. There is nothing, however, in the techniques developed by Thurstone which requires that the attitudes measured be of this nature. For example, Richardson (2) has applied the attitude techniques to the development of descriptive rating forms used for rating the efficiency of industrial employees. The rating form consists of a number of statements about the employee. By means of one of the scaling techniques a scale value is determined for each statement on the rating form.

For each man who is to be rated his supervisor checks each statement on the form which applies to the man. The man's rating is then a function of the scale values of all the statements which have been checked for him.

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\*Read before the Psychology Section of the Ohio Academy of Science on March 30, 1934.

This type of rating scale differs from the conventional attitude scales in that a single individual, the rater, expresses his attitude toward a number of different objects, the men being rated. With the conventional attitude scales a number of individuals express their attitude toward the same object or issue.

Several techniques have been developed by Thurstone for determining the scale values of the statements included in the attitude scale. The simplest of these methods is an application of the psychophysical method known as the Method of Equal Appearing Intervals. By this method the attitude continuum is divided into a number of equal intervals. Each of a number of judges then allocates each statement to the interval on the continuum which he thinks best represents the extent to which the statement implies an attitude for or against the issue under consideration. The scale value finally assigned to a statement is a function of the intervals to which the statement has been allocated by the judges.

A second and more elaborate scaling method has its counterpart in the psychophysical Method of Constant Stimuli. By this method each statement is paired with every other statement in the series and for each pair the judges indicate which of the statements expresses the more favorable attitude toward the issue. It is then possible to determine for each pair the proportion of judges who indicated that one of the statements expresses a more favorable attitude toward the issue than the other. Through statistical treatment of these proportions a scale value for each statement is finally derived.

It is to be noted that both of these methods require a group of judges to provide data for scaling the statements. In applying the attitude techniques to the scaling of statements on a descriptive rating form, Richardson suggested that instead of scaling the statements by means of a group of judges it might be possible to scale the statements after the forms had been checked for each of a group of individuals who were to be rated. The method which he suggested was based on the hypothesis that the scale value of each statement should be taken as a function of the average score of the men for whom the statement was checked and, further, that the score of each man should be taken as a function of the average scale value of the statements checked for the man.

A technique based on these assumptions was developed and applied to the scaling of statements which had previously been scaled by the Method of Equal Appearing Intervals. This technique has been called for convenience the Method of Reciprocal Averages. Scores based on scale values determined by the Method of Equal Appearing Intervals were found to correlate .975 with scores based on scale values determined by the Method of Reciprocal Averages. This indicates that the two methods give highly comparable results. The Method of Reciprocal Averages has the advantage,

however, that no preliminary group of judges is required for scaling the statements.

But more important than this is the later research which the Method of Reciprocal Averages has motivated. One of the fundamental requisites of any scaling procedure is that a distribution of scores calculated from the scaled statements should exhibit a significant amount of variability. If the statements had been scored by some purely chance procedure, then we should expect that the statements for which any individual is checked would be scattered pretty well throughout the entire range of the scale, and that the average of all the scale values of the statements checked for him would be about the middle of the scale. The more nearly random the scaling procedure, the more closely about the mean of the scale would all the scores cluster and the smaller would be the variability or standard deviation of the distribution of scores. In general, then, the most unsatisfactory scaling procedure conceivable is one which results in identical scores for all persons measured. If we take as our criterion of the most satisfactory scaling procedure possible one which gives just the opposite result we may say that the statements should be scaled in such a way as to give a distribution of scores with maximum dispersion. That is, the statements should be scaled in such a manner as to give the largest possible discrimination among the individuals measured.

To determine how well these conditions are satisfied by the Method of Reciprocal Averages, certain mathematical equations were developed. These equations were found to bear a significant resemblance to the scaling equations underlying the Method of Reciprocal Averages. The equations, however, were not identical. For this reason it was thought worth while to develop a complete scaling procedure based on the criterion of maximum dispersion, rather than to regard this criterion merely as a test of the validity of the Method of Reciprocal Averages.

The general approach to this problem was first to regard each statement in the scale as a single test variable on which it is possible to make a score of either one or zero, depending on whether the statement is checked or not checked. A man's score is then a composite of the scores made on all the statements. The problem is to determine a weight for each statement such that when the weighted scores are combined into a single score for each man the distribution of all the scores has the largest possible dispersion. These weights are the scale values to be assigned to the statements.

But the method, when formulated in this manner, need not be restricted to the determination of weights for dichotomous variables such as we have in scores on single statements. It may be extended to the general case where we have a number of different sets of measures for a group of individuals. These measures may be multivalued or continuous variables



such as speed or accuracy of performance. The problem now is to determine weights for each variable such that a composite score calculated from the weighted scores on the individual measures gives a distribution of maximum dispersion.

Suppose now for any such sets of measures we reduce each set to standard measures, such that the mean of each set is zero and the standard deviation unity. To these sets of standard measures let us apply the mathematical conditions for determining weights which will give a maximum dispersion in the distribution of composite scores. The equations which we obtain finally for determining the weights are most interesting.

These equations are identical to those which have been derived by Professor Hotelling for quite another purpose. Professor Hotelling (2) derived these same equations for determining the number and amount of independent factors which a group of tests has in common.

Previously Thurstone (3) had derived a set of equations very similar to those of Hotelling and for the same purpose.

In our original research we had no thought of relating the scaling problem to the multiple factor problem. Therefore, it was something of a surprise to discover that our scaling equations were identical to Hotelling's factor equations and similar to those of Thurstone.

To appreciate the significance of this similarity it is instructive to examine the solutions of the Hotelling equations. The number of equations is equal to the number of tests being analyzed. Likewise, the number of solutions for the equations is also equal to the number of tests. Each solution gives a factor loading for each test. Hotelling describes two methods for solving the equations. One method is an exact mathematical solution; the other is an approximate iterative solution. The exact solution is very laborious, however, and is prohibitive if the number of variables is greater than four or five. The approximate solutions are much less laborious. These solutions yield the factors in the order of their importance as determined by the percentage of the total test variances which they account for. The first solution gives the amount of the factor in each test, which is most important in causing correlations between the tests. The next solution gives the amount in each test of the factor of second greatest importance, and so on. Mathematically there will, in general, be as many factors as there are tests. But if the intercorrelations are mainly due to only a few factors, then these will come out first in the solution and the subsequent factors will be so small as to be negligible.

It is important to note that the methods of both Thurstone and Hotelling are generalizations of the General Factor theory of Spearman. Their method, however, may be definitely regarded as superseding the analysis developed by Spearman.

But the basic problem which these and other investigators are attempting

to solve is the same. They are all trying to determine the basic independent traits which when combined in varying proportions result in the multitudes of traits and abilities which have been described in both popular and scientific terminology. They have tried further to determine these traits in such a way as to reduce the total number to a minimum. Theirs is the general scientific problem of simplifying and reducing the number of categories required to account for observable phenomena.

To see more clearly how the multiple factor and scaling problems are related, let us examine the basic assumption underlying the measurement of an attitude by the use of a series of scaled statements. The techniques previously developed assume that the attitude is a unidimensional variable and that each statement in the scale represents a given amount of that variable. Common sense tells us, however, that attitudes are complex things composed of a number of different factors. This is true whether we are speaking of a man's attitude toward war or of a supervisor's attitude toward an employee. An unfavorable attitude toward war may be due to religious beliefs, fear of physical injury, etc. Similarly a supervisor's attitude toward an employee may be conditioned by such diverse factors as initiative, cooperativeness, and ingenuity. It would seem, then, that it might be worth while to determine the basic factors underlying the general attitude and to attempt to measure the strength of each of these basic factors for any given individual.

The similarity of the analytical formulation underlying the criterion of maximum dispersion and that underlying the multiple factor analysis methods suggests the possibility and the general method for doing just this sort of thing. The type of scaling technique which we have suggested provides for obtaining more than one set of scale values for a series of attitude statements. The successive sets of scale values are analogous to the successive factor loadings obtained by the methods of Thurstone and Hotelling. Each set of scale values provides a measure of an independent attribute of the general trait or attitude which we are attempting to measure. Thus we can break the variable down into its basic factors and measure the individual for each factor.

The arithmetical procedure for determining the sets of scale values is precisely the same as that for determining the factor loadings for a group of tests. It should be noted, however, that in actually solving for these multi-dimensional scale values even the iterative method provided by Hotelling is too laborious to be considered for a large number of statements. A simplified method of solution has been developed by Thurstone (4) which is much more rapid and the results apparently are accurate enough for all practical purposes.

In the analysis, the set of scale values representing the most important component of the attitude variable is automatically obtained first. Success-

sive sets of scale values are obtained in the order of their importance. Numerical criteria are available to determine when the statements have been scaled with reference to all the important components of the attitude variable. As a matter of fact, it is possible to stop the scaling process arbitrarily at any factor. The conventional unidimensional scaling procedures may be regarded as special cases of the general method. In these special cases the scaling is not carried beyond the first factor.

It is evident from preliminary studies that a great deal of research still needs to be done in the way of applying the multiple factor techniques to scaling problems. Probably, however, most of this research must wait for further advances in the theory and techniques of the multiple factor problem itself.

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#### CONTENTS OF A COURSE IN PSYCHOLOGY AND PERSONALITY

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The writer, from conversation with other psychologists and with student counselors, has detected a growing demand for courses in Personality. The content demanded ranges all the way from a rigorous fundamental course in theory to charm-school courses for creating more and better hostesses. In view of the extremely broad field connoted by this topic and the different approaches<sup>1</sup> that are undoubtedly made in courses on the subject it wot'd seem profitable for some of us engaged in such projects to exchange outlines. Such a course was given at Iowa State College in 1932-33 and will be described briefly.

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<sup>1</sup>From a survey of some eighty college and university catalogs, it appears that courses in Psychology and Personality stress abnormal personality, maladjustment, and allied topics.

In our instance, the development of the course was stimulated by (1) suggestions of faculty members outside the department of psychology, (2) requests by students, and (3) evidence of interest as manifested by attendance at extra curricular lectures on Psychology and Personality.

The "major objective" in our course was the answer to the question, "What is personality?" The emphasis was placed on the development of normal personality. Reference to atypical or extremely defective personality was made only to illustrate points regarding normal personality—and such reference was made only when demanded for clarity. The scope of the course is entirely outside of the field of abnormal psychology. It is only indirectly within the field of mental hygiene. The course was not designed as a remedial course of the charm-school type for those enrolled. Several books dealing with abnormalities of personality appear in the reading list—but only sections dealing with explanations in terms of the normal personality were utilized. About three thousand five hundred pages of readings were assigned. The reading list and bibliography are combined, and appear below.

The ten major categories of the course content may be briefly outlined as follows:

#### I. Introduction.

- A. Discussion of general requirements for specific positions, such as music supervisor and social worker.
- B. Aspects of behavior which make up the individual's personality.
- C. In study of personality, man is viewed socially. (9)

#### II. Personality variables.

- A. Analysis (9) of personality variables in six categories—physique, intelligence, motility, temperament, motivation, and sociality.
- B. Analysis (35) in ten categories—general level of behavior, general survey of instinctive and emotional equipment and attitude, general habits of work, activity level, social adaptability, recreation and sports, love and regard, reactions to conventional standards, personal bias and peculiarities, and balancing factors.
- C. Classification (12) of explicit bodily habits, emotional habits, and implicit behavior.
- D. As a possibility for the future factor analysis to see how many actual factors are needed to account for most of what we call personality.<sup>2</sup>

#### III. Pseudo systems of analysis.

- A. Psychology "gold bricks" (6), astrology, spiritualism, phrenology, and physiognomy.

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<sup>2</sup>This point, suggested by Dr. Harold E. Burt, is being incorporated.

- B. Commercial systems of character analysis, with discussion of absurdities involved.
- C. Some attempts to base study of personality upon anatomical and physiognomical characteristics. (13, 31)
- IV. Confusions in concept of personality.
  - A. Use of unstandardized terms by those attempting to define or describe personality and its aspects.
  - B. Vagueness as chief characteristic of many concepts—"magnetic personality," "novelists' it," cinema "personality requirement" lists.
  - C. Misuse of terms, e.g., honest, sincere.
  - D. Explanations as "deeper reasons below organized word level." (35)
- V. Study of personality.
  - A. Problem is a laboratory pursuit.
  - B. Importance of sampling behavior—same problem of adequate sampling as presented by all aspects of tests and measurements.
    - 1. Many tests available (15); standardized tests, e.g., tests of "general intelligence" contribute their part to whole problem of measurement of personality.
  - C. Inventories of aspects of personality, such as hobbies, special interests, special skills.
  - D. Typical studies, such as those of Hartshorne, May, *et al.*
- VI. Current problems in the measurement of personality.
  - A. Training in industry. (30)
  - B. Development in higher education.
    - 1. Help courses, "charm schools," milder psychiatric efforts, mental hygiene.
  - C. Training in young children. (18)
  - D. As a general problem for society.
    - 1. Rehabilitation, occupational readjustment, employment stabilization.
- VII. Illustration of a means of instruction in one personality variable.
  - A. Motion pictures<sup>3</sup> of instruction in posture, and corrective exercises for posture defects—to illustrate a teaching device.

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<sup>3</sup>Three films used: *Good Posture Wins*, the success of a club girl in her work due to improved posture; corrective exercises, two reels, 35 mm. Produced and distributed by the Office of Motion Pictures, United States Department of Agriculture, Washington, D. C. *Posture*, defects in posture; corrective exercises; examples of sports winners; two reels, 35 mm. Distributed by Children's Bureau, United States Department of Labor, Washington, D. C. *Posture*, prepared in cooperation with the American Posture League. Good posture, both standing and sitting—the part played by the muscles in determining whether it shall be good or bad—how to correct poor posture—and the importance of good posture in physical well-being. One reel, 16 mm. Distributed by Eastman Teaching Films, Inc., Rochester, N. Y.



- VIII. Acquisition and fixation of habits; breaking habits.
- A. Chain reflexes.
  - B. Conditioned reflexes and the central nervous system.
  - C. Learning as habit building.
    - 1. Selection and fixation.
    - 2. Integration.
  - D. Explicit and implicit habits.
  - E. Neural bases.
  - F. Breaking habits as substituting habits.
    - 1. Classification of habits as "bad" from end-point—social and genetic.
  - G. The influence upon habit of fatigue and drugs.
- IX. One variable illustrated; psychology and effective speaking.
- A. Speech as communication, and as a means for influencing the behavior of others.
  - B. Nature and function of speech, social adaptation and control. (24)
  - C. Effective speaking easy to perfect and develop. (25)
    - 1. Importance of speaking and writing in judgment of personality.
  - D. Imaginative descriptions from 17th century literature, of the behavior of "types" of individuals.
    - 1. "His dinner was his other work. A terrible fastener on a piece of beef."
  - E. Class project in rating—every student receives a rating, using both man-to-man and graphic rating scales. Individual discussions and analyses of ratings.
- X. Anthropological and ethnological contributions.
- A. Studies in other types of social organization. (21)
  - B. Many maladjustment problems of our type of civilization non-existent in other social orders.
  - C. Inferences for more highly organized civilizations.
  - D. Summary.

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## SPATIAL LOCALIZATION OF THE SELF

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It is related that young Michael Faraday used to thrust his head through the bars of a London railing and challenge his companions to state which side of the fence he was on (4). Faraday was willing to take either side of the argument.

With so many weightier aspects of selfhood still in the category of unsolved problems, it is not surprising that the matter of the localization of the self has not received much attention. Sherrington, writing on cutaneous sensation, stated, "Inasmuch as a man's body is in part objective to his own 'self,' a noumenon, and sensible, coming partly into the range of his various specific sensual fields, thermal sensations can be referred by the 'I' to the material 'me'" (10). This appears to the casual reader a highly mystifying sentence, though it may be readily seen to suggest that selfhood is not a characteristic of the entire body, but rather of some part of it. A medical man in an article on facial neuralgia (11) suggests, "If the ego could be located, it would be placed behind the eyes." Claparède (3) had earlier come to a similar conclusion. In the only extensive treatment of localization with which we are acquainted, he offers "*je le (the self) situe d'une façon très exacte dans le milieu de ma tête, au centre d'un plan horizontal qui passe par les deux yeux.*" Claparède's observations of the locali-

zation of his own self, and of those of his acquaintances whom he questioned and who responded satisfactorily, led to a theory regarding the self as a point of view, with localization at the apex of the angle formed by the boundaries of the visual field when projected on into the skull. Had not our own observations required a review of this theory, the following, by L. S. Hollingworth, would have done so.

When people wish to indicate "myself," they usually point to the center of the chest, or else make an outward curving gesture with the arm. These characteristic movements are often accompanied by a slight inclination of the body. People do not usually, for example, point to the feet, the eyes, the forehead, the neck, or into the open mouth when indicating "myself." Of all psychologists who have discussed the self, William James has spoken most penetratingly. He arrives finally at the conclusion that the "innermost self" resides chiefly in a series of movements in neck and head—this in spite of the fact that people do not point to these parts of the anatomy when indicating the self. (5)

The criterion for localization, the act of pointing, which Hollingworth establishes, is arbitrary, as all criteria are, but it has a certain amount of justification. We may at this point suggest, however, that the verbal report of adults who are evidently responding in good faith in reply to an unequivocally expressed question ought to be entitled to as much consideration as an objective indicator which may be accounted for on the grounds of physiological and social convenience. When an individual is observed to indicate himself by one of the gestures described above, it is rare that the gesture is the result of careful thought following a specific query. It seems desirable, before we conclude this résumé of some of the available literature, to call attention to the commendable caution with which William James actually described the localization of the self. "In a sense, then, it may be truly said that, *in one person at least*, the 'Self of selves,' when carefully examined, is found to consist mainly of the collection of these peculiar motions in the head or between the head and throat" (6, italics ours). Note that there is no ascription of a similar localization of the self to other individuals!

Our inquiry started while attempting to check informally Piaget's theory explaining the animism of children as due to a confusion between the subjective and the objective worlds (9). Joan, aged three years eight months, was interviewed in the presence of her mother. The child was well known to the writer and satisfactory rapport was established. The interview proceeded somewhat as follows: *Who are you?* "Joan." *Who is Joan?* "Me." *Is this Joan* (pointing and touching bed alongside)? "No." *Is this?* "No." Touching the various objects as we proceeded, we drew such responses as: Slipper—no, leg—no, head—no, body—yes, neck—no, etc.

The child seems to localize Joan quite definitely in the abdomen and lower thorax; the back was not Joan, appendages and head were described as hers, but not her.

This experience occurred before our survey of the literature and was, consequently, somewhat of a surprise. Four days later, discussing it with a friend in a store, a strange youngster wandered in from the street, and we proceeded to demonstrate the phenomenon under consideration. Conversation yielded that the child's name was Lena, and Lena was three years old (accuracy unchecked). Lena localized herself in the body, at first. As we continued exploring in order to check the consistency of the response, Lena appeared in her lower right jaw. She was not in the hand, arm, or leg, not in the eye, head, nor other (left) jaw. Lena seemed fixed in her lower right jaw. The definiteness of this localization may be indicated by her petulant response when we touched her right cheek-bone and asked, "*Is this Lena?*" "What is the matter with you? I told you three times, this (pointing) is me."

Five days after the original exploration, a retest was made of Joan and she was found to be still in the same place, the belly and lower chest, but not in the head, neck, arms, legs, nor back, nor dress, nor shoes.

The chronological aspect of localization is not clear, as yet. Barbara, sister to Joan, at the age of two years six months, localized herself in the mouth region of her face. The gesture indicating where Barbara is, was: hand across the mouth covering the chin and opened mouth, fingertips resting on the edges of the upper incisors. A pinch on the calf hurt "my leg," but not Barbara. A group of ten four-year-olds of superior intelligence were queried by an investigator (description of the children by the investigator is found in reference 2) and all of them "knew" themselves to be in all parts of their body. Mona, aged four years two months, responded to "*What's-this*" questions with "my leg," "my head" (Note, not Mona, but something belonging to Mona). Though at first she had pointed to her head as "me," she later indicated her body. After perhaps a half hour at play, when asked in peek-a-boo fashion, "*Where's Mona?*" she tapped her head.

Shakespeare has Polonius conclude his precepts to his son, Laertes, with:

This above all—to thine own self be true;  
And it must follow, as the night the day,  
Thou canst not then be false to any man.

(Hamlet, Act I, Scene 3)

It is unlikely that Polonius refers to Laertes' lower right jaw or a point in the middle of the head at the level of the eyes. The connotation involves a functional concept of the self which we have as yet not considered.

Maintaining our localization orientation, we can here consider Köhler's



concept, "If somebody accompanies me along a street and, ahead of *us* another pair is walking, I feel (and partially see) myself as a member of one of two groups" (7). The social factors are even more pronounced in Baldwin's self-concept, "We found then that when I think of myself I ipso facto think of you" (1).

The apparent gap between the highly specific body localizations with which we opened our discussion and these more ephemeral descriptions of self can probably be bridged by consideration of the individual who could not give a fixed localization. He inclined to be just behind the eyes, especially when thinking. When looking out of the window at a cruising automobile, he was vaguely "out there" on the street looking at it. When reading from a paper held in his hands, he would localize himself in the space between his eyes and the sheet from which he was reading.

A questionnaire on self-consciousness in a sense somewhat closer to the popular conception of the term was distributed to a class of 45 students in elementary psychology. Question ten read: "If you *had* to locate yourself at some one point either within or external to your body proper, some one point that 'is you,' where would that point (or area) be?" Space was provided for the recording of three choices in order. The blanks were filled out with complete anonymity. Of the 45 subjects, 32 gave some response to this question. Thirteen filled in three choices, eight gave two, five recorded only one, and six responded in a fashion not readily classifiable in terms of a definite localization.

The following is a tabulation of the localizations, not discriminating between those presented as first choice and as later choices, and the frequency of their report.

head 9	hair on head 1
brain 6	throat 1
brain back of eyes 1	heart 6
back of eyes 1	chest 3
eyes 6	lungs 1
between eyes 1	shoulders 2
above eyes 1	hands 4
glasses 1	fingers 1
face 4	genitals 3
profile 1	abdominal and genital region 1
forehead 1	body (form) 1
nose 1	body as a whole 1
mouth 1	
teeth 1	

Of the 60 locales for the self recorded, 36 might be considered head localizations and the other 24 fairly miscellaneous.

The unclassified responses not included in the above tabulation were: (a) some point intermediate between the brain and the genitals; (b) don't

think of myself as an area but as a feeling; (*c*) surrounded by a group of people; making a speech; power behind the throne; (*d*) very near to my body; farther away; (*e*) at my whole person; my home; my associates; (*f*) an invisible vantage-point from which all the world could be seen; a bird. (*a*) to (*f*) represent the six subjects whose responses could not be tabulated; several of these six gave more than one response, as can be seen.

Question nine of the same questionnaire read: "Is there anything with which you tend to identify yourself, some object or symbol? If so, describe it." Not many responded positively to this question. Their descriptions follow: (*a*) general striving for social good, but not very energetically; (*b*) swimming ability; (*c*) the symbol is a great athlete, such as I would like very much to be; (*d*) a desire to have power, to be president; (*e*) a person successful in academic life, recognized as an authority in history, economics, etc., and who is a truly cultured man; (*f*) good natured, I try to be a good natured, jovial, polite sort of person; (*g*) I identify myself with a man dressed in white, who leads the crowd; (*h*) some symbol of good looks; (*i*) no single object, but such tendencies at times present; (*j*) the sea, stormy gray clouds with the wind in the East and a strong smell of salt; (*k*) intellectual conquest, and a desire for knowledge (not a bookworm). These responses are presented as they appeared on the question blanks; they were not, with one exception, the same individuals whose responses are quoted above.

In view of the numerous locales of the self as described by different individuals, the localizations reported as the result of interviewing children, a general consideration of the question of the localization of the self, and the two appended case studies, it is our belief that the localization of the self is evidence of the previous formation of an association between the concept of self and some body part or other identifying locale. It would seem that the less stable and more dynamic descriptions represent the association with some other concept rather than a definite body part, the self-localization being frequently only a center of reference to assist in the spatial conceptualization of the situation. The preponderance of head localizations in adults is probably due in large part to our educational system's inculcation of the notion of head dominance, the brain's ruling and directing the body. This socially derived association may be secondary to the physiological stimulations which recur about the head, e.g., eye movements, eating movements, talking, etc. (see Murphy's discussion, 8). The extent to which the localization is to be accounted for by some motor theory which involves a tentative movement of the musculature of the organism as the basis for a conscious concept is at present quite unknown.

The following autobiography of a self-localization was prepared by Constance at our request. It is of interest to note that this description serves admirably to support the theory explaining localization as a chance associa-

tion, yet the letter which accompanied it was most apologetic and included, "in addition, I'm fully convinced that what I've written is absolutely of no value or interest." Constance is a twenty-year-old female college junior who has had courses in elementary and abnormal psychology.

*Constance:* It was not until the question was broached to me that I ever considered the possibility of one's being concentrated in a particular organ. I had been somewhat conscious of my nose for some time, but it was not until I began to think about it that I conceived of it as "embodying me." I don't know whether that was an honest realization; it may be that I was struck by the unusual nature of the question into fooling myself into thinking that this actually was the case with me. In addition, there are some circumstances which might account for my naming my nose rather than anything else.

From a front view, this organ is of unpretentious shape and proportions. It is only from the side that one can see how really small it is and that it has a decidedly upward slant. It is not unusual that I was relatively unacquainted with this view of my face since I spend very little time at the mirror. In the past few years, however, it has received quite some tribute and since I try at all times to be honest with myself, I looked to see whether it was deserving. That seemed to bring it to my attention. Whatever the original stimulus may have been, the fact remains that now I feel as though it were expressive of my whole personality.

My nose is very sensitive—every time my mood changes, there are corresponding changes in sensation in it. Even its angle seems to shift—when I feel gay and flirtatious, up goes the nose; it falls when I'm depressed. Sometimes it feels as though it had a sharp tip, other times it feels as though it were very broad. Whenever anybody pinches it I almost unconsciously try to mold it back to its original shape with two fingers. My nose seems to have all the weight of my face concentrated in it so that I feel as though it ought to be very large.

The case of Constance presents very simply the accidental development of the localization and gives us some clue as to its functioning as a general reference point. In her case, however, the localization is not a very integral part of her scheme of things; the next report suggests the far-reaching effects of the localization in some instances. Doun's sketch has been abbreviated.

*Doun:* . . . The more direct interest here, is another mechanism. The one that sets values of different degrees of ultimateness on different parts of the same body. It is undeniable that historically at least, the choice was not an unconscious (and so inevitably given) one. The right hand had been used in the many failures and regretted actions of the existence. And the left hand had generally escaped prominence in these matters. Moreover, the right hand was the traditionally

honored hand, and to that extent a non-personal pride. As the man who didn't know whether or not he could play the piano, because he had never tried, the self could claim that there were powers perhaps possessed, for after all, only the right hand had failed to prove their presence—the left hand had not been crucially tested. It must be understood that from such negative starts great positive values were built up. Thus, there were definite and serious attempts to keep the distinction an essential and a valid one. The test of the self participation in an emotion or an attitude was readily judged from the reluctance or willingness to do it with the left hand, the private name (another categorization of life). If courting was the activity under weigh, and the more or less committing moment came, the self contrived so to arrange matters that the burden of the activity and participation was right-sided. When once and only once (the exception lasting four years) the effort was made to involve the left, and chiefly the left, it was a sign to the self that the self was committed. Expedience in the world's being too much with us, late and soon, required pretenses and mild hypocrisies. To keep them from ever becoming so ready a second nature as to be quite the self, for all intents and purposes, the personal stand on the subject was always indicated. Would the letter go in a left hand drawer or a right hand drawer? Would the answer be pounded sealed with the left hand or the right hand? It must be apparent that the right and left meanings and values were to a large extent book-keeping mechanisms. But it would seem an essential fact that the self did insist that it was not to be confounded with the haphazard arbitrary things of life, and it chose this device as an adequate means of insuring the impossibility of confusing the self as self accepted with any of its unconcerned compromises, or time serving non-essential-to-it mechanisms.

The self is not localized, but it is impossible to suppose it to be present in some parts. Thus the left hand is not the place the self resides, but it is definitely the duly accredited representative of the self, as the right is not. Of course, if the left becomes too readily involved in matters the self will not be committed about, the left may lose its value as direct spokesman for the self; this being something like the Pope's being able to delegate powers to judge to councils, but despite his vesting them with all his powers that he can, they are not committing him when they blunder.

The superior validity of the left was not innate. This is established by a memory of the sixth year, at which time, when cleaning the nails of the left hand with those of the right, the left was personalized as asking, who, then, would clean the right; and it was felt that such a pretty speech was too good, for the left hand began to clean the right to give it a chance to make the noble, unselfish speech. But when, age about ten, a copy of the *Arabian Nights* was read containing a story of a young man that offered the physician his left hand, which seemed to be taken, by the physician, as a sign of snobbishness, the basis seemed to be laid for a distinction. Later the

cause of this feeling of inferiority of the left hand in Arabian lands was learned (at about fourteen), being rooted in the lavatorial use of the left hand in these countries. Galton mentions the survival in him of a feeling of disparagement to the left from being so long in these countries. The personal habit was just the contrary, which was one cause of the exaltation of the left. Besides, about the same age there had been a rather baseless narration made of a fantastic erotic exploit, the charmingest detail of the story being the magic patentness as aphrodisiac of a caressing of the left breast with the little finger.

These two fused much later—at about twenty—but straightway after the first reading of the explanation of the Arabian values, the left for personalness, for pure, for unbespoken, seems to have grown. The largest element was its unbespokenness, its lack of past failure and regrettable performance. It was in actualness a new leaf, always reserved. Thus, enthusiasm might put forth the right hand in pledging handshake, but if the thing seems to have declined in worth, it was worldly accident, not really personal fallibility.

Doun, the author of this second autobiographical sketch, is a twenty-four-year-old male graduate student of psychology. His localization, when originally reported, was in the left side of a right-left body dichotomy. The right side was the mundane side, the left was the personal side where the self would be localized. During the course of the self-analysis occasioned by our request for his own statement of the phenomenon under consideration, his realization of the unreality, and his attribution of selfhood to this side rather than its inherent existence there, grew.

We are unable to present a final statement describing where the self actually is; we should merely like to conclude that the localization of the self as is reported in the literature quoted, in the responses on our questionnaire, in informal discussion, in the investigation of children, is not the basic phenomenon one might hope for to ease an analysis of the structure of the self and personality. The more or less stable and constant association of the self-concept with the particular body regions, functions, or external objects or conditions serves chiefly as a reference point for the individual as a whole in the situation. Beyond this, the localization has little reality and its superficiality becomes apparent, generally, on closer introspective analysis.

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## BOOKS

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J. L. MORENO. *Who Shall Survive? A New Approach to the Problem of Human Interrelations*. With a Foreword by W. A. White. Washington: Nerv. & Ment. Dis. Publ. Co., 1934. (Nerv. & Ment. Dis. Monog. Ser. No. 58.) Pp. xvi+440.

This extraordinary volume does genuinely contain "a new approach to the problem of human interrelations"; in fact, it contains two new approaches of the first magnitude, either of which would justify the very considerable enthusiasm with which the book has been greeted. Some months ago I saw the book on my desk and noted its strange title and stranger format, and asked myself if it could be worth reading. I glanced within and saw some dozens of charts. Evidence that someone had done some work on the reactions of people to one another, but to what purpose I could not make out. I decided to give a whole week-end to the book—I thought I would be generous. But I found that there was not a chapter that could be merely skimmed through, not a page that did not have to be carefully studied. The book required nearly a week to read—one of the most valuable weeks of my year. Every simple drawing represents a complex social pattern, "frozen" for a moment for presentation on the printed page, and cut asunder from its context because of the necessity of starting with the simple "social atoms" in our social cosmos. The charts show the positive and negative affect of each individual towards many other individuals, considered with reference to participation in some social activity. In one case, for example, the charts show which children wish to sit with others in school. In a second instance, the chart shows the positive attraction of girls for one another in the cottage life in the Hudson Training School for Girls. In a third instance, the "sociometric" diagram shows which ones accept each other or reject each other in a work situation (e.g. a steam laundry). Sociometry is the study of positive and negative social responses between the members of groups, always considered in reference to some particular social situation. The technique of sociometric testing is rather complicated since a great deal depends upon the age, sex, IQ, and social characteristics of the persons tested, and the errors to be guarded against are complex and numerous. In essence, however, we have a living picture of the basis of social cohesion and social rejection. The result is a demonstration of "mutual pairs"; "triangles," where each one of a group of three is drawn to the other two; groups in which positive affect reaches on through a series A, B, C, D, E, until the end of the group is reached (these groups are called "chains"); "stars," individuals who re-

ceive positive affect from a whole cluster of associates; and "isolates," individuals who are accepted by no one.

The social structure which appears in the diagrams reveals many things of theoretical and of practical significance. Such a chart prepared for a cottage of thirty girls may reveal where there is strength and where there is weakness. The morale of a group depends not on total affectivity, or algebraic summation, but on organization. Key individuals may bind and organize and give character to a structure, and through them, and their own "network" of associates, the community achieves some measure of integration.

Special kinds of sociometry are applied when a new girl comes to Hudson: the "parent test" and the "family test." A girl in a key position in her own cottage acts as cottage representative. The house mother and the key girls of the cottages give a tea at which new girls to Hudson are socially entertained. After preliminary introductions, the cottage representative has an opportunity to talk individually with each new girl and, after the conversations are over, to indicate which girls would probably be acceptable in the cottage. The house mothers similarly interview the new girls, one at a time, in their own rooms, and after these interviews, indicate which girls they would like to have in their cottages. The new girl has the same right of discrimination and choice. She decides which of the representatives, and which of the house mothers, she wishes to accept. Frequently the girl's first choice may coincide with the direction from which affection is reaching out to her, but if she cannot have first choice, she can at least have second, or at worst, third. The vast majority of the new admissions are happily taken care of in cottages made up of those who really wish to be together. Under these terms, it is not surprising that the morale of the institution, already exceptionally high on account of the imagination and humanity of its director, has gone even higher, and that overt signs of distress as shown in runaways have fallen almost to the zero point. The grouping of girls in terms of IQ levels is but a meager and myopic step in comparison with grouping in terms of basic compatibility. To be sure, preferences change, and complete sociometric work is done all over again, and acted upon, every six weeks for the entire Hudson Community.

Yet of all the stimulating ideas offered by this book, I think the most novel and the most important is the conception of "*spontaneity training*," which is organically related to sociometry but has further implications for personality study. The first step in the procedure is called "spontaneity testing." Two individuals at a time are chosen as participants, a testee and a partner. The experimenter asks the testee to assume at will any attitude he likes—anger, fear, cajolery, sympathy, etc., and to speak and act toward the partner in free expression of his attitude. The partner

is simply to respond as he would ordinarily respond to such an approach in everyday life. Since absolute realism of the experimental situation is essential, Moreno gives the background fully and then quotes many pages of dialogue. In most instances, the testee finds after a few seconds that the element of "being tested" is quite secondary (it is frequently forgotten altogether); he is face to face with a person towards whom he has developed an affective reaction. The other person has responded; the natural thing is to go ahead with the action—argument, taunt, friendly chat, or whatever it is in its own terms. A tremendous amount is quickly discovered about the relations *actually existing* between persons, and in this way we have a supplement to the sociometric tests.

But the main idea goes deeper. The problem is to test the qualitative aspects of the capacity to act in accordance with a mood; to sustain conversation, gesture, and posture in the living out of one central orientation towards another person. Upon the testing, in many situations with many partners, follows *spontaneity training*, the learning how to be utterly spontaneous in the living of a given rôle at a given tempo and in accordance with a spontaneously chosen quality of living. Spontaneity training is in part a form of vocational training; it becomes a part of learning how to sell yard goods, wait on table, or interpret the possibilities of interior decorating. But it is a great deal more. It is a basic training in self-liberation. It involves learning how to discover and actualize social affect of all sorts in utter sincerity; it involves the rediscovery of much meaningful expression which is ordinarily paralyzed or confused by stereotyped conventions and "etiquette."

But how, we may ask, can one train a person to be spontaneous? Are we not dealing here with the most perfect of all contradictions in terms? The answer lies in the consideration of the nature of the drama. The concepts in use here are mostly new to the psychologist, and require some explaining, although the student of dramatics will recognize in what follows some very basic and well-established concepts of histrionic training. It is essential that the actor who is to play Cyrano de Bergerac should be capable of showing infinite scorn as he tosses the purse away as a "gesture," and infinite disgust when the remarks about his nose lack the subtlety which they might have shown. Yet the actor who would play Cyrano must practice every intonation, every gesture. He must know exactly where to stand and how to wait for the exact dramatic moment. The actor can achieve spontaneity in only one way. He must so perfectly master all details of action that they will occur without a thought. Though he has identified himself with Cyrano, he can pour himself forth in Cyrano's expression only if the wording and stage business are complete second nature. The great actor is spontaneous not because he has avoided training, but because he has completely assimilated training and can express himself through it instead of contending against it.

Suppose, however, that the play is not something to be rehearsed and learned; suppose it is the play of life itself. The part to be played is ever a new one. No actor is ever equipped by his training to be spontaneous in all situations. He must study each part and think of each performance in relation to its audience. Moreno, basically a dramatist, thinks of spontaneity training as reaching a level of the psyche which dramatic training rarely reaches. It has much in common with the most inspired modern training in dramatics. The individual learns not only the set forms through which he can express himself but the very art of self-liberation. This is in fact an educational and therapeutic measure of the utmost importance. Many a psychiatric problem, the key to which is lost as one fumbles for early trauma, becomes meaningful as we follow the patient hour by hour in his struggle with present problems. The purpose of spontaneity training is to study social responses not as perpetually mummified residues from a former living struggle, but as expressions of a need which is *now* finding a channel of expression; every social impulse and every social grouping is directly observed *in statu nascendi*.

*Spontaneity testing* is the first step in *spontaneity training*; and *spontaneity training* leads on into *sociometric testing*. It was through the discovery of the way in which social groups are born that the quantitative indices of social groups, in the form of sociometry, came into being.

The book makes many contributions to social theory, yet meets the most acid test of practice, for example, in handling juvenile delinquency. It is primarily a book on method in social psychology, but the method is so well thought out and so shrewdly adapted to circumstances that we may fairly say a whole new field of research has been surveyed and thrown open to us.

By way of orientation in this new field, I should like to contrast two types of social psychology now prevalent. One type works with strictly biological concepts, treating the human organism as other organisms are ordinarily treated in laboratories. It usually assumes that the important variables in behavior are to be found there in the laboratory, waiting to be controlled, and that if life reactions belie the laboratory, the trouble is somehow with life reactions. In time we shall control more and more variables, work with younger and younger subjects, get genetic and statistical evidence to supplement our experiments, etc. In other words, cling to the main framework of experimental psychology, and trust to future work to improve the scope and quality of the experimentation. The other kind of social psychology begins by describing the group behavior in the large—the family, the parliamentary body, the crowd—and then proceeds to analyze these large frescoes into *elements*, elements like Adam Smith's *Moral Sentiments*, Fouillée's *idées-forces*, F. H. Allport's *prepotent reflexes*. In the nature of the case, the elements thus located and the way



in which they are put together are too arbitrary to carry conviction, for the complexity of social behavior is too great. But the point is that this second psychology has committed itself first of all to the study of society, and if it cannot study society in the laboratory, it waives the point and goes ahead anyhow without the laboratory. With all its limitations, it is without any doubt a genuine social psychology. In mentioning these types of social psychology we have, for example, the extraordinary contrast between F. H. Allport's *Institutional Behavior* and his original declaration of purpose which proposed in 1920 to make social psychology an exact experimental science. Allport, the experimentalist, is really more interested in the life blood of daily social behavior than in any of the claims of our laboratories or even the promise which these laboratories give, and he has the integrity to say so. Many sociologists, sorely annoyed by the laboratory emphasis which Allport did so much to establish, may now note the trend of the mid-thirties and many remind Allport and the rest of us that they have always been skeptical; they may say, with pardonable testiness, "We told you so." The Graham Wallases, McDougalls, and Cooleys said so twenty years ago, and they have gone on working in their own way.

Yet their case, too, is less impressive when one notes that the content of the nonexperimental volumes shows as much confusion and as much uncertainty as to where sociology is going as it did twenty, or fifty, years ago. Negatively, the case against the laboratory seems a bit convincing; but if one asks what positive shape has been given to the social sciences by the continuation of "systematic thinking" one finds that the systems are more painfully at loggerheads than ever.

Turning from this sad dilemma, this failure of the two prevalent schools, one confronts, once in a blue moon, such a book as Moreno's. The book expresses a profound and deeply sensitive philosophy of social relations, based in some measure upon Nietzsche, Freud and Bergson, but given a three-dimensional quality by virtue of the dramatic imagination and expression of the author. Secondly, one finds the sustained determination to see everything as presenting both qualitative and quantitative problems, so that one asks how much there is of each new thing which is discovered and locates meaningful quantitative parts—"atoms"—of everything that has been investigated. Third, one finds natural social groups actually treated as laboratory groups. One chooses for purposes of analysis those variables which are most identifiable and important in life, and whose dependence upon other variables can be ascertained. Finally, the whole method is led in the direction of practical creative work through the *reorganization* of social groups by the experimenter and by the members of the group themselves. Experiment here means alteration of basic life interests. Scientific and therapeutic requirements are combined, for the reason that by these

methods the psychiatrist can find out what the present needs and fears of his patients are.

One thing, however, is vouchsafed which few psychiatrists have ever really worked out, namely, the conception that maladjustment is a group sickness. Instead of trailing the neurotic through a hundred hours of dialogue, with the endless ringing of changes on his past troubles, we have an immediate placement of each individual in an environment which he himself craves; whole groups are constituted in terms of the needs of each member. To the question whether this might not bring on permanent infantilism in some, Moreno is able to reply that it is only by living through one's spontaneous choices, actualizing them and realizing their implications, that one can find where his perfect social adjustment is likely to lie. This is a great deal more like Jung than like Freud. If one can imagine Jung thinking in scientific terms and testing his hypotheses with quantitative method, one has some inkling of the spirit of Moreno's work.

Even so, however, we should have to add the concept of spontaneity training, the concept which puts the cap stone on a brilliant achievement. It might have been thought sufficient to find here a new quantitative method which makes possible the study of many social groups in a truly experimental spirit, yet without the artificiality into which most such experiments have fallen. This book, however, has gone beyond the description of this new method and has offered a rich promise of psychiatric and educational usefulness in the unfolding of inarticulate and uncompleted personalities.

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*New York City*

### BOOKS RECEIVED

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# NEUROTICISM IN MARRIAGE:

## III. THE APPRECIATION OF NEUROTICISM\*

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### MEASURES OF APPRECIATION

Of the many measures which might be constructed to measure the adequacy of appreciation of the maladjustments of one spouse by the other, we have selected five, which overlap to some extent but not greatly. We have not attempted to treat in detail the problem of the appreciation of *adjustment*, chiefly because of the difficult statistical problems introduced by the small and varying incidences of the separate items. It will be readily understood that the "shorthand" terms "correct," "incorrect," "error" (except in connection with error in the estimate of difference, which is an objective fact), etc., are used merely for convenience, as there is of course no method of determining whether a disputed ascription of maladjustment to the spouse on any item is a misapprehension on the part of the ascriber or an instance of inadequate self-understanding on the part of the spouse.

The most interesting of the measures constructed is probably that which we shall call "insight," referring to insight into the maladjustments of the spouse rather than, as ordinarily used, self-insight. This measure is defined as the percentage of the spouse's total maladjustments "correctly" apprehended by the ascriber; it is, so to speak, a measure of his efficiency in agreeing with his subject that the latter is subject to maladjustment. The second measure is approximately the converse of this; it is called "projection," and is defined as the percentage of all the judgments of maladjustment by the ascriber which were "wrong." The third is somewhat more objective, and includes judgments of adjustment as well as maladjustment; it is a series of four measures which may be referred to collectively as "agreement." The first of these is complete agreement (*A*), the meaning of which is self-evident; the second and third are symbolized as  $P_h$  and  $P_w$  which may be read "the number of items on which the

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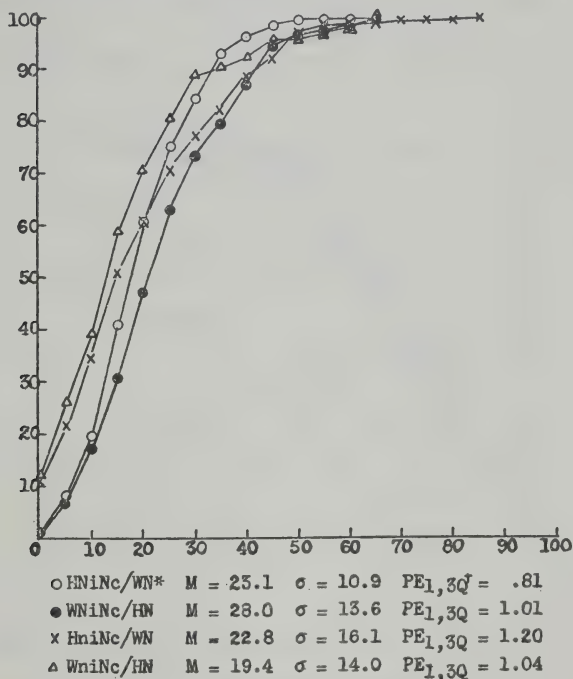
husband is 'right' and the wife 'wrong' " and "the number of items on which the wife is 'right' and the husband 'wrong' "; the fourth is represented by  $D$ , complete disagreement. These, it is obvious, add to the total number of items concerned (223 in the case of the entire test); in practice, however, it is desirable to use instead of  $A$  the quantity  $A-p$ , where  $p$  is the number of items on which there is complete agreement that no maladjustment exists; this quantity in most instances is as large as all of these other categories combined. The fourth principal measure concerns the amount of difference present (the sum of the cases in which the husband is maladjusted, the wife adjusted, and those in which the wife is maladjusted, the husband adjusted) and the estimates of this quantity (that is, the number of items checked by each spouse); "maladjusted" and "adjusted" in this connection have been symbolized as  $N$  (neurotic) and  $n$  (normal). The fifth measure is bipartite, and has been called "common burden" ( $HNWN$ ) and "unique burden" ( $HNWn$ ,  $HnWN$ ); the difference mentioned above is thus the sum of the unique burdens, while the total neurotic score for either spouse is the sum of the common burden and the unique burden for that spouse. These measures will be considered in order, and under each will be considered the scale as a whole, the categories as sub-scales, and the items singly and grouped into categories.

### INSIGHT

It will be useful to begin with a brief discussion of such a symbol as  $WNiNc/HN$  (wife neurotic, imputes neuroticism correctly, divided by husband neurotic); this is an example of the measures of "insight" as defined in the preceding section. It contains a good deal of verbal shorthand, which may be misleading if not carefully thought through; its basic unit is not a wife, but an item in which the wife's response is the maladjusted one, and in which she implies (by not checking the item) that her husband is also maladjusted on the same point; further, he is of the same opinion, that is, he also marks the maladjusted response as his own; and last, the sum of these units is made comparable with those of other couples by converting it into a percentage of the husband's total neurotic score. In short, the measure is an index of the efficiency with which wives maladjusted in specific items estimate that their husbands feel maladjusted in the same items, or more broadly, of the influence of maladjustment



upon the ability to detect maladjustment. By parallel reasoning we may derive the corresponding measures  $WniNc/HN$ ,  $HNiNc/WN$ , and  $HniNc/WN$ ; we shall neglect the imputation of normality, since (1) this is complicated by  $p$ , the large class of perfect agreements on common normality, and (2) conclusions respecting normality are presumably the converse of conclusions about neuroticism. It will be observed that the sum of the two percentages beginning with  $W$  gives, when compared with the corresponding  $H$  measure, an indication of the influence of sex upon insight, while the corresponding processes applied to the  $N$  versus the  $n$  percentages yield similar information about the influence of neuroticism (in specific items) on insight (in the same items).



\*Husband neurotic, imputes neuroticism correctly, divided by wife neurotic, and similarly.

†Probable error of the first and third quartiles.

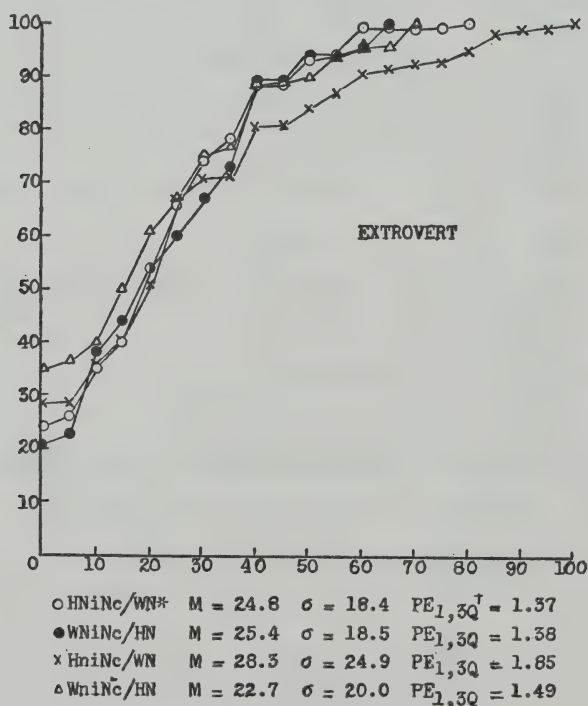
FIGURE 5

Distribution of these measures will have as ordinates (e.g.) the number of wives with a given percentage (expressed on the abscissa) of efficiency in "insight." Because of the graphic difficulties of representing these clearly for four series on each set of axes by means of the usual histograms, cumulative (ogive) curves will be used for this purpose, but they will be accompanied by means and standard deviations.

*The Scale as a Whole.* The distributions of the insight percentages for the four groups are given in Figure 5.

There are no large sex differences, the husbands' lines lying in general between the wives'. The superiority of  $WN$  to  $Wn$  is marked, indicating that for the wives maladjustment in an item is a favorable influence upon insight for that item. The  $Hn$  distribution is noticeably more variable than the  $HN$ .

The correlation between wife's age and insight is  $.09 \pm .06$ ; that



\*Husband neurotic, imputes neuroticism correctly, divided by wife neurotic, and similarly.

<sup>†</sup>Probable error of the first and third quartiles.

FIGURE 6

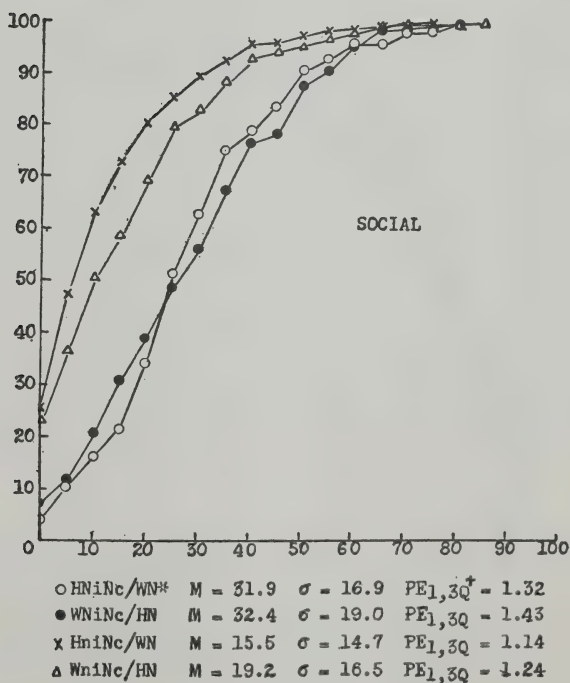
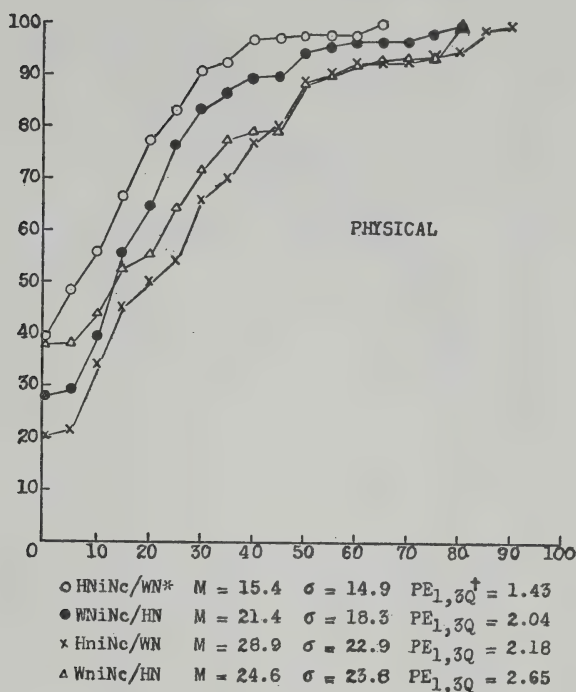
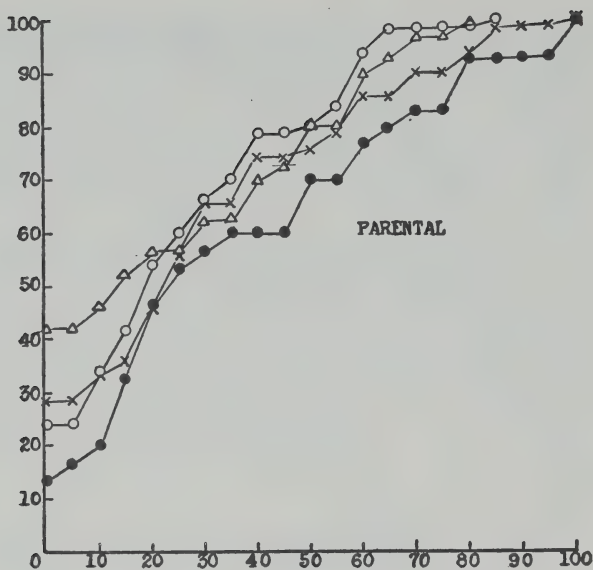
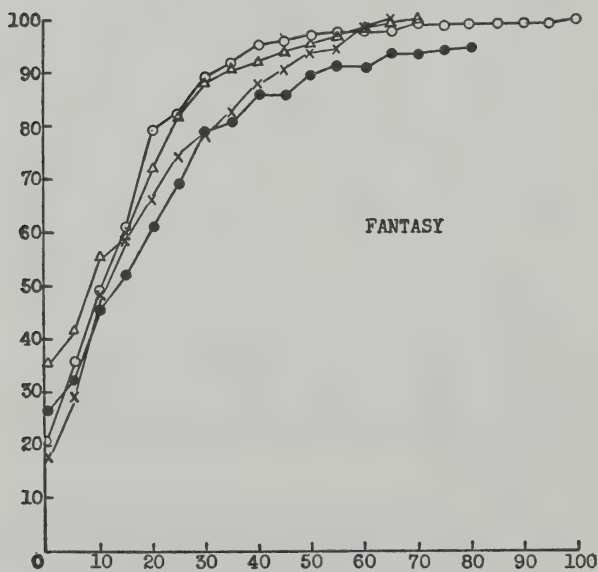


FIGURE 6 (continued)



○ HNiNc/WN*	M = 28.5	$\sigma = 22.6$	$PE_{1,3Q}^{\dagger} = 2.94$
● WNiNc/HN	M = 39.6	$\sigma = 30.0$	$PE_{1,3Q} = 5.04$
× HniNc/WN	M = 32.4	$\sigma = 27.8$	$PE_{1,3Q} = 3.62$
△ WniNc/HN	M = 27.2	$\sigma = 26.5$	$PE_{1,3Q} = 4.44$



○ HNiNc/WN*	M = 18.5	$\sigma = 16.0$	$PE_{1,3Q}^{\dagger} = 1.25$
● WNiNc/HN	M = 22.3	$\sigma = 19.1$	$PE_{1,3Q} = 1.74$
× HniNc/WN	M = 21.3	$\sigma = 17.2$	$PE_{1,3Q} = 1.35$
△ WniNc/HN	M = 17.3	$\sigma = 16.2$	$PE_{1,3Q} = 1.35$

FIGURE 6 (continued)





between her insight and duration of marriage is  $.007 \pm .06$ . The corresponding figures for the husband are  $.014 \pm .06$  and  $.04 \pm .06$ . The association with number of children is indicated in the distribution shown on p. 403.

As the largest  $dM/P.E.d$  of this group (1 vs. 3-4-5, husbands) is only about 1.3 and the differences are not systematic, they may be dismissed as chance variations, with the conclusion that no relationship can be demonstrated between insight and size of family.

*The Categories.* Wide differences in insight between the categories are evident from the curves and constants given in Figure 6.

Of the six categories, Sex cannot be represented because of insufficient data based on adequate denominators; Extrovert shows no certain differences; the rest show large and often systematic differences. In every case except Physical the normal is inferior to the neurotic wife (shorthand!) in insight. In Social the difference is in the same direction for the husband, but in the other three it is reversed. There is no appreciable sex difference in Fantasy; in Physical the wife's curves lie between the husband's; in Parental and Social the wife is slightly superior. In general, then, we are probably safe in conceding a slight advantage to the wife and to the neurotic.

*The Items.* For the items it will be sufficient to report only the items falling into each pattern of response. For example, an item in which

$$\begin{array}{ll} HNiNc/WN = 27 (\%) & WNiNc/HN = 30 \\ HniNc/WN = 35 & WniNc/HN = 41 \end{array}$$

is consistent in showing superior insight in the *normal* and the *wife*. (The statistical significance of differences may be ignored, inasmuch as we shall deal with fairly large populations of items; it varies with the incidence of the item and other factors.) We may employ the symbol  $nW$  to designate this pattern (to be distinguished from  $Wn$ , of course). An item showing

$$\begin{array}{ll} HniNc/WN = 15 & WNiNc/HN = 7 \\ HniNc/WN = 12 & WniNc/HN = 2 \end{array}$$

is correspondingly to be designated  $NH$  (neurotic, husband). We shall thus have four patterns of items,  $NH$ ,  $nH$ ,  $NW$ ,  $nW$ , to which

we may add an inconsistent pattern (*I*) to include items with "crossed" indications, such as

$$HniNc/WN = 46$$

$$WniNc/HN = 55$$

$$HniNc/WN = 52$$

$$WniNc/HN = 43$$

In the case of only partial crossing of indications, the state of affairs may be represented by such a symbol as *IH* or *nI*. Parentheses are used to show inconclusiveness. When one group, such as

$$HNiNc/WN = 25$$

$$WNIc/HN = 5$$

$$HniNC/WN = 25$$

$$WniNc/HN = 29,$$

in the first determination is equal or inconclusive, a parenthesis is placed before the number of the item; when one group in the second determination is inconclusive the parenthesis is placed after the item; when one group in each determination is inconclusive, parentheses are placed before and after. When both groups of a determination are inconclusive double parentheses are used in the same manner and the item is placed under "*I*."

The items falling under pattern *NH* are as follows:

Fantasy—	6	life a burden
	19	day-dreams improbable
	75	impulse to steal
	186)	unlucky
	202	can't make up mind
Social—	28	feelings hurt
	80	talk and regret
	98	stand criticism
	138)	avoid meetings
	180)	enliven dull party
	196	help in accident
	205)	thought critical
Physical—	208	things get misty
Parental—	(77	dizziness
	(159	mother loved more
Extrovert—	190	like puzzles
Sex—	137)	sex vs. morality

The items falling under the pattern *nH* are as follows:

Fantasy—	(26)	frightened
	47	worry, possible misfortunes
	51)	uneasy in tunnel
	53)	afraid of disease
	(55	worried about religion
	(63)	frightened in night
	(64)	uneasy, small room

	(84)	uneasy over river
	85	interests change
	(103)	day-dreams unpleasant
	168	low spirits
	(185)	being followed
Social—	2	control temper
	36)	dislike people
	126)	denied social chance
Physical—	7)	stuttering
	27)	nervous breakdown
	(56)	partly paralyzed
	(60)	St. Vitus' dance
	(154)	blushing
	(162)	feel well
	163	tired, work
	(198)	anemia
	210	appetite
	(213)	heart fluttering
	218)	wetting bed
Extrovert—	32	leave tasks unfinished
	200)	learn way easily
Sex—	29)	easily shocked

Those falling under pattern *NW* are as follows:

Fantasy—	(35	things unreal
	71	desire for suicide
	73)	day-dream frequently
	86	desire, run away
	(111	talk to self
	(124	depressed, low marks
	149	know self well
Social—	1	play alone
	18	social leader
	89	be by yourself
	123	thought queer
	150	meet important person
	(157	different when young
Parental—	147	mother dissatisfied
Sex—	95	friendships, own sex
	222	indifferent, opposite sex

Those falling under pattern *nW* are as follows:

Fantasy—	(21	lonesome
	40)	thought selfish
	58	afraid of insanity
	74	happy childhood
	(105	happy adolescence
	113	absent minded
	(114	fear of fire
	141	stand blood
	142	good spirits
	(211)	lost memory

Social—	13)	difficulty starting conversation
	15	laugh easily
	44	lose temper
	(61)	people find fault
	(67)	threatened with harm
	(116)	treated right, employers
Physical—	120)	contradicting habit
	215)	bad child
	42	sit still
	50	talk in sleep
	82	headaches
	110	eyes pain
	144)	vomiting
	160)	nightmares
Parental—	166)	sleep well
	216	faint easily
	22	father loved more
	107)	scapegoat in family
Extrovert—	134)	family suicide
	59	like indoor sports
	118)	finding way, dark
Sex—	170)	find way easily
	(128)	cynical, opposite sex

Those falling under pattern *IH* are as follows:

Physical—	152	miserable
	204	physical defects
Parental—	45	mother cheerful
Extrovert—	14	lose head in danger
	38	cool in danger

Those falling under pattern *IW* are as follows:

Fantasy—	39	remorse
	148	things go wrong
	184	lack self-confidence
Social—	115)	make friends easily
Physical—	((9	heart beats banish sleep
	((133	physically inferior
Parental—	((81	father relations pleasant

Those falling under pattern *NI* are as follows:

Fantasy—	16	worry over humiliation
	24	afraid of falling
	(31	ideas banish sleep
	76	afraid, high place
	(97	being hypnotized
	151	not old self
	(201	inferiority feelings
	(206	mood swings
Social—	3	stage fright
	10	introductions at party

	30	keep in background
	70	late, rather stand
	72	nonconformity
	91	allow crowding
	(100	being watched
	(119	thoughts being read
	140	like companionship
	145	self-conscious in recitation
	169	enjoy social gatherings
	178	disturbed by criticism
	181	self-conscious with superiors
	187	public speaking difficult
	209	interested, people met
Physical—	(78	dizziness
	109	falling sensation
	179	rested in morning
Parental—	4	mother relations pleasant
	122	parents happy
	188	mother dominant
	212	home happy
	221	love vs. hate for family
Extrovert—	96	like responsibilities
	121	intellectual vs. athletic
	183	rather work indoors
Sex—	125	ignorant of sex
	130	difficult urination

Those falling under pattern *nI* are as follows:

Fantasy—	(11	think people self-seeking
	108	mind wanders
	(153	particular useless thought
	156	food crank
	(194	frightened by lightning
Social—	12	can't dismiss salesman
	17	avoid hurting feelings
	(25	interested, meeting people
	41	upset to lose
	43	trust people
	(131	turned against
	207	angry, let go
Physical—	5	constipation
	34	indigestion
	37))	pressure about head
	(62	watch health
	(66	bad pains
	93	heart trouble
	132))	temporary sensory loss
	(155	lateral headache
Parental—	8	get on with siblings
	69	parents partial
	(102	family abnormal
Extrovert—	(20	get turned around
	192	plan work ahead
Sex—	68	sexually inferior



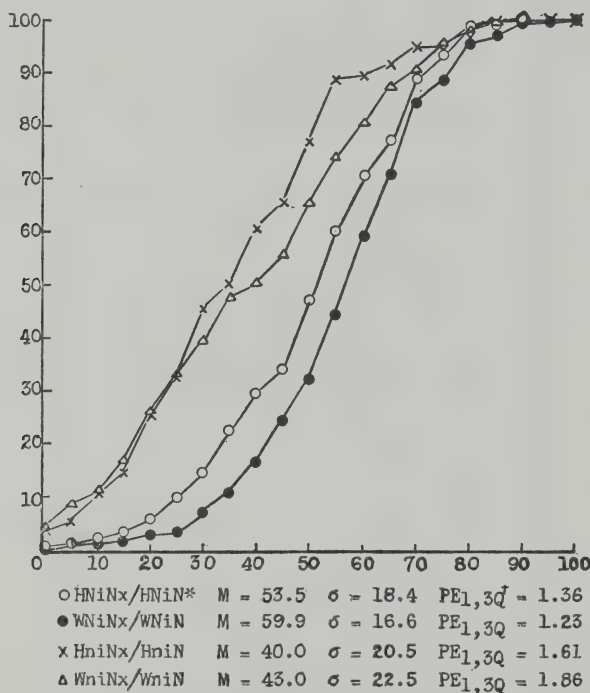
Those falling under pattern II are as follows:

Fantasy—	23	nervous
	52	feelings alternate
	65	seen vision
	79	discouraged
	92	dread snake
	((101))	impulse, set fire
	104	chores without worrying
	((106))	afraid of drugs
	127	touchy
	129	thoughts of death
	136	excitement
	139	grouchy
	158	upset easily
	164	deserve better
	174	not adjusted
	177	loneliness
	193	uniform spirits
	197	need to repeat
	199	uneasy crossing street
	214	slow in decisions
	((219))	fear crushing, crowd
	220	confident about abilities
Social—	33	books more interesting
	57	shyness
	83	get even
	94	self-conscious at work
	99	difficulty making friends
	112	stand kidding
	143	made fun of
	161	hesitate in recitation
	((173))	mind, ten-cent store
	175	dislike writing about self
Physical—	182	tired, people
	195	self-conscious over appearance
	48	fatigued in morning
	49	stand smells
	((87))	convulsions
	88	stand pain
	90	tears
	117	feel tired
	135	poor health
	176	twitching
	189	shooting head pains
	191	unpleasant feelings
Parental—	((203))	suffocating
	((223))	walk in sleep
	((165))	family drug habit
Extrovert—	217	treated right, family
	46	rattled easily
	54	tire, amusements
	146	thrifty about loans
Sex—	167	systematic
	171	shy with boys
	172	shy with girls

The sum of the numbers of items in patterns  $H$  is a measure of the relative superiority of the husband's insight, and may be compared with the corresponding sum for patterns  $W$ ; these figures are 51 for the husbands and 56 for the wives, indicating the slight superiority of the wives, as before. The corresponding figures for  $n$  and  $N$  are 88 and 69 respectively, which, however, does not confirm previous results.

### PROJECTION

The "projection" measures such as  $HNiNx/HNiN$  (husband neurotic, imputes neuroticism "wrongly," divided by husband neurotic, imputes neuroticism), are simply one kind of converse measure of the same phenomenon measured by "insight." The treatment will accordingly follow the latter point by point.



\*Husband neurotic, imputes neuroticism wrongly,  
divided by husband neurotic, imputes neuroticism

†Probable error of the first and third quartiles

FIGURE 7

*The Scale as a Whole.* The distributions of the projection percentages for the four groups are presented in Figure 7.

The differences are marked and consistent; wives are more likely than husbands to ascribe neuroticism "wrongly," and maladjustment is especially conducive to "errors" of this sort.

The correlation between wife's age and projection is  $.05 \pm .05$ ; that between her projection and duration of marriage is  $.07 \pm .06$ . The corresponding figures for the husband are  $.06 \pm .05$  and  $.14 \pm .06$ . The association with number of children is indicated in the distribution on p. 414.

The largest difference (that between 1 and 3-4-5) divided by its standard error yields a critical ratio of 1.59. While this is not technically significant, certain relationships in the data are reminiscent of other findings. Among these is the fact that the childless husband is rather more likely to make wrong judgments of neuroticism than the childless wife, a state of affairs that is reversed in the one-child group. This suggests, as do the findings on the total neurotic score, that the advent of a child is in some way a stabilizing influence upon the husband and a disorganizing one upon the wife. Another finding of the same sort is the tendency for the wife's erroneous judgments to decrease with increasing number of children, while the reverse is true with the husband. The absolute size of these means (which are in terms of percentages) suggests that, if the group be considered as a whole, whether an individual is "correct" or "incorrect" in his judgment of neuroticism in his spouse is largely a matter of chance; however, the wide distribution makes it clear that this is by no means the case individually, since on the average about one-sixth of the group are twice as likely to be "right" as "wrong" and another sixth are about twice as likely to be "wrong" as "right."

*The Categories.* Wide differences in projection between the categories are evident from the curves and constants given in Figure 8.

As before, Sex cannot be represented because of insufficient data. Parental, for the same reason, cannot be represented. In each of the remaining four categories the neurotic curves lie to the right of the normal, the four curves being widely separated in Physical. In Fantasy, Social, and Extrovert *WN* and *HN* cross each other, *WN* being a little to the right. It is clear that in the categories as in

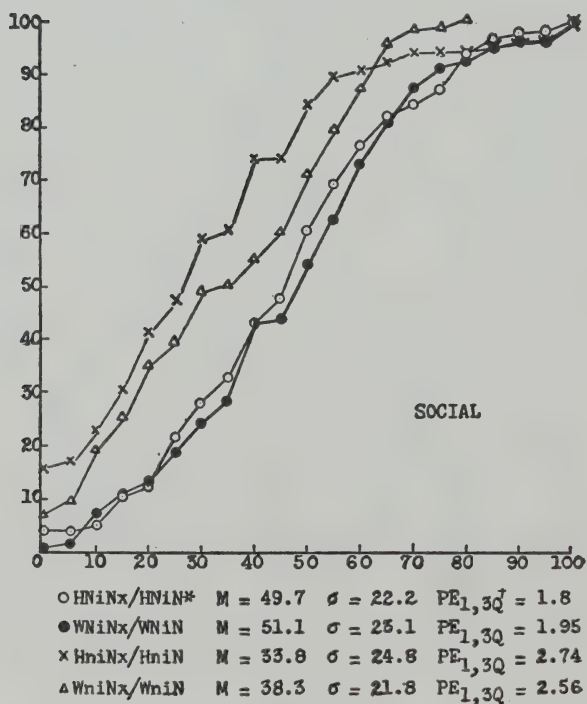
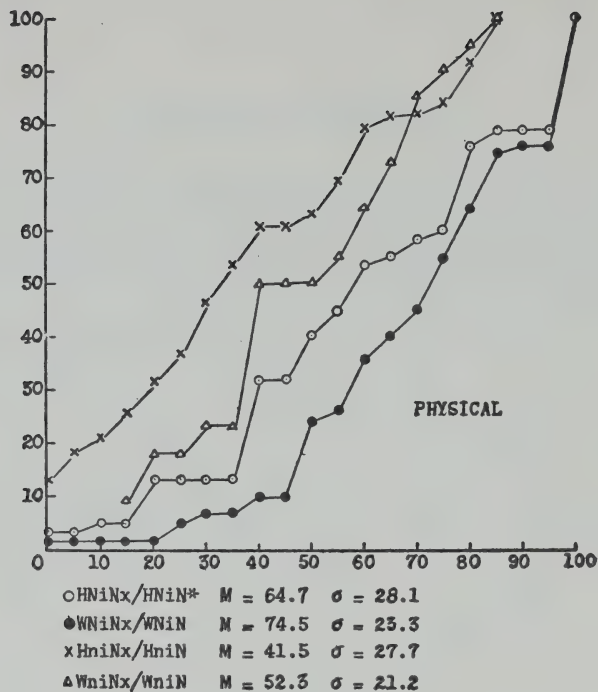
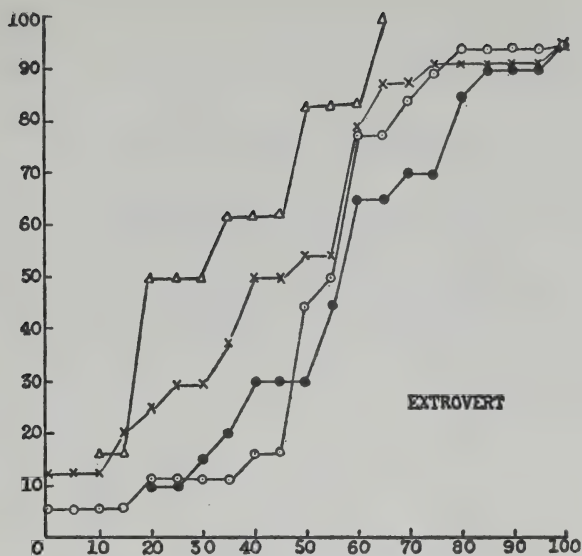


FIGURE 8



○HNINx/HNIN\*  $M = 57.5$   $\sigma = 24.0$   $PE_{1,3Q}^{\dagger} = 7.78$

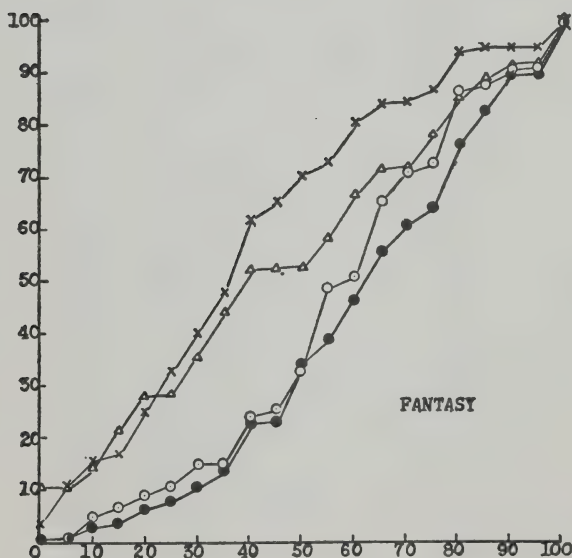
●WNINx/WNIN  $M = 61.8$   $\sigma = 23.1$   $PE_{1,3Q} = 4.75$

xHNINx/HNIN  $M = 47.5$   $\sigma = 31.1$   $PE_{1,3Q} = 5.65$

ΔWNINx/WNIN  $M = 35.8$   $\sigma = 19.2$   $PE_{1,3Q} = 7.18$

\*Husband neurotic, imputes neuroticism wrongly,  
divided by husband neurotic, imputes neuroticism.

<sup>†</sup>Probable error of the first and third quartiles.



○HNINx/HNIN\*  $M = 62.5$   $\sigma = 23.8$   $PE_{1,3Q}^{\dagger} = 2.38$

●WNINx/WNIN  $M = 65.6$   $\sigma = 24.1$   $PE_{1,3Q} = 2.27$

xHNINx/HNIN  $M = 43.4$   $\sigma = 25.6$   $PE_{1,3Q} = 2.96$

ΔWNINx/WNIN  $M = 49.5$   $\sigma = 26.8$   $PE_{1,3Q} = 4.1$

FIGURE 8 (continued)





the total, maladjustment and femaleness favor a large proportion of "wrong" ascriptions of maladjustment.

*The items.* The items are grouped under patterns of response, as before. It must be kept in mind that *NH* now comprises those items on which the neurotic and the husband are especially likely to be "wrong."

Those falling under pattern *NH* are as follows:

Fantasy—	11	think people self-seeking
	53	afraid of disease
	86	desire, run away
	113	absent minded
	148	things go wrong
	156	food crank
	197	need to repeat
	(211)	lost memory
Social—	10	introductions at party
	12	can't dismiss salesman
	25	interested, meeting people
	33	books more interesting
	43	trust people
	61	people find fault
	(67)	threatened with harm
	70	late, rather stand
	140	like companionship
	150	meet important person
	157	different when young
	161	hesitate in recitation
Physical—	175	dislike writing about self
	205	thought critical
	215	bad child
	27	nervous breakdown
	34	indigestion
	62	watch health
	93	heart trouble
	(133)	physically inferior
Parental—	(210)	appetite
	102	family abnormal
	(134)	family suicide
	188	mother dominant
Extrovert—	(38)	cool in danger
	54	tire, amusements
	118	finding way, dark
	146	thrifty about loans
Sex—	170	find way easily
	29	shocked
	68	sexually inferior
	130	difficult urination

Those falling under pattern *nH* are as follows:

Fantasy—	6	life a burden
	(103)	day-dreams unpleasant
	186)	unlucky
Social—	83	get even
Sex—	(128)	cynical, opposite sex

Those falling under pattern *NW* are as follows:

Fantasy—	21	lonesome
	(26)	frightened
	39	remorse
	47	worry, possible misfortunes
	51)	uneasy in tunnel
	58)	afraid of insanity
	71)	desire for suicide
	74	happy childhood
	(84)	uneasy over river
	85)	interests change
	108	mind wanders
	114	fear of fire
	124)	depressed, low marks
	139	grouchy
	142	good spirits
	158	upset easily
	168	low spirits
	184	lack self-confidence
	194	frightened by lightning
	202	can't make up mind
	206	mood swings
	214)	slow in decisions
Social—	2	control temper
	13	difficulty starting conversation
	17	avoid hurting feelings
	36)	dislike people
	44	lose temper
	57	shyness
	80	talk and regret
	89)	be by yourself
	94	self-conscious at work
	115)	make friends easily
	(19)	thoughts being read
	120	contradicting habit
	(123)	thought queer
	126)	denied social chance
	131	turned against
	138)	avoid meetings
	195	self-conscious over appearance
	207	angry, let go
Physical—	7)	stuttering
	(9)	heartbeats banish sleep
	37)	pressure about head

	42)	sit still
	48	fatigued in morning
	49	stand smells
	(60)	St. Vitus' dance
	90	tears
	117	feel tired
	(135	poor health
	152	miserable
	155)	lateral headache
	160)	nightmares
	162	feel well
	(198)	anemia
	(213)	heart fluttering
	218)	wetting bed
Parental—	217	treated right, family
	221	love vs. hate for family
Extrovert—	14	lose head in danger
	20	get turned around
	32	leave tasks unfinished
	200	learn way easily
Sex—	222	indifferent, opposite sex

Those falling under pattern *nW* are as follows:

Fantasy—	(55	worried about religion
	97)	being hypnotized
	104	chores without worrying
	(199)	uneasy crossing street
Social—	112	stand kidding
	187	public speaking difficult
	196	help in accident
Physical—	191	unpleasant feelings
	208	things get misty
Sex—	125	ignorant of sex
	137)	sex vs. morality

Those falling under pattern *IH* are as follows:

Fantasy—	164	deserve better
Social—	72	nonconformity
	169	enjoy social gatherings
	180	enliven dull party
Parental—	212	home happy
Extrovert—	183)	rather work indoors

Those falling under pattern *IW* are as follows:

Fantasy—	19	day-dreams improbable
	23	nervous
	24	afraid of falling
	52	feelings alternate
	((63)	frightened in night
	79	discouraged
	129	thoughts of death
	151	not old self

	177	loneliness
	193	uniform spirits
	201	inferiority feelings
	220	confident about abilities
Social—	28	feelings hurt
	91	allow crowding
	100	being watched
	178	disturbed by criticism
	181	self-conscious with superiors
Physical—	78	dizziness
	109	falling sensation
	189	shooting head pains
Parental—	4	mother relations pleasant
	77	parents' favorite child
	122	parents happy
Extrovert—	121	intellectual vs. athletic
	167	systematic

Those falling under pattern *NI* are as follows:

Fantasy—	16	worry over humiliation
	40	thought selfish
	(64))	uneasy, small room
	73	day-dream frequently
	(76	afraid, high place
	92	dread snake
	105	happy adolescence
	136	excitement
	153	particular useless thought
	(185))	being followed
Social—	1	play alone
	3	stage fright
	15	laugh easily
	30	keep in background
	41	upset to lose
	99	difficulty making friends
	(116))	treated right, employers
	145	self-conscious in recitation
	209	interested, people met
Physical—	5	constipation
	50	talk in sleep
	66	bad pains
	82	headaches
	110	eyes pain
	(132))	temporary sensory loss
	(144))	vomiting
	154	blushing
	163	tired, work
	(166))	sleep well
	176	twitching
	179	rested in mornings
	204	physical defects



Parental—	8	get on with siblings
	45	mother cheerful
	69	parents partial
	81	father relations pleasant
	107)	scapegoat in family
Extrovert—	147	mother dissatisfied
	46	rattled easily
	59	like indoor sports
	190	like puzzles
	192	plan work ahead

Those falling under pattern *nI* are as follows:

Physical—	216	faint easily
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Those falling under pattern *II* are as follows:

Fantasy—	31	ideas banish sleep
	35	things unreal
	65	seen vision
	75	impulse to steal
	((101))	impulse to set fire
	((106))	afraid of drugs
	111	talk to self
	127	touchy
	141	stand blood
	149	know self well
	174	not adjusted
Social—	((219))	fear crushing, crowd
	18	social leader
	98	stand criticism
	143	made fun of
	((173))	mind, ten-cent store
Physical—	182	tired, people
	((56))	partly paralyzed
	((87))	convulsions
	88	stand pain
Parental—	((203))	suffocating
	((223))	walk in sleep
	22	father loved more
	159	mother loved more
Extrovert—	((165))	family drug habit
	96	like responsibilities
Sex—	95	friendships, own sex
	171	shy with boys
	172	shy with girls

The sum of the numbers of items in patterns *H* is a measure of the relative tendency of the husband to "error," and may be compared with the corresponding sum for patterns *W*; these figures are 51 for the husbands and 100 for the wives, indicating the greater superiority of the wives. The analogous figures for *n* and *N* are 17 and 146.

### AGREEMENT

*The Scale as a Whole.* The measure of appreciation of maladjustment which we have called "agreement" comprises four aspects, as indicated above: (1) perfect agreement as to the adjustment or maladjustment of the spouses, (2, 3) partial agreement, wherein one spouse estimates correctly the other's reaction, and (4) complete disagreement; from (1) it is convenient to subtract the class of cases ("p") where there is complete agreement as to the adjustment of both spouses. The measures are symbolized *A-p*, *Ph*, *Pw*, and *D*; the couple is, as before, the unit of measurement. The distributions for the scale as a whole are as follows:

	0	5	10	15	20	25	30	35	40	45	50	55	60
A-p	4	17	28	32	26	14	7	13	3	3	3	1	
Ph	10	30	35	23	23	8	12	5	5	1			
Pw	7	19	19	24	20	21	20	7	7	4	1	2	
D	3	7	20	30	29	16	15	11	7	6	5	1	1
	65	70	75	80	85	90	95	M	$\sigma$				
A-p							1	20.8	13.0				
Ph								17.1	10.3				
Pw			1					22.4	12.9				
D			1					24.9	12.9				

The superiority of the wives in appreciation of their spouses' neuroticism is again apparent. Total disagreement, however, is more frequent than any other class investigated.

*The Categories.* The distributions for the categories are presented in the form of cumulative ogive curves to facilitate comparison in Figure 9.

Roughly the same relationships may be seen to hold between *A-p*, *Ph*, *Pw*, and *D* for the categories as for the total.

*Agreement by Items.* The measures for the four types of agreement will be presented by item, keeping the items under the categories for convenience:

#### *Fantasy.*

	6	11	16	19	21	23	24	26	31	35	39	40	47	51	52	53	55
A-p	7	7	34	8	8	28	45	10	20	3	10	8	17	4	15	10	4
Ph	5	12	12	19	13	18	17	2	17	7	5	17	26	5	15	5	2
Pw	10	8	34	18	18	31	32	27	26	14	19	13	23	12	24	19	7
D	13	8	33	38	27	24	22	2	29	21	28	20	26	6	33	17	3

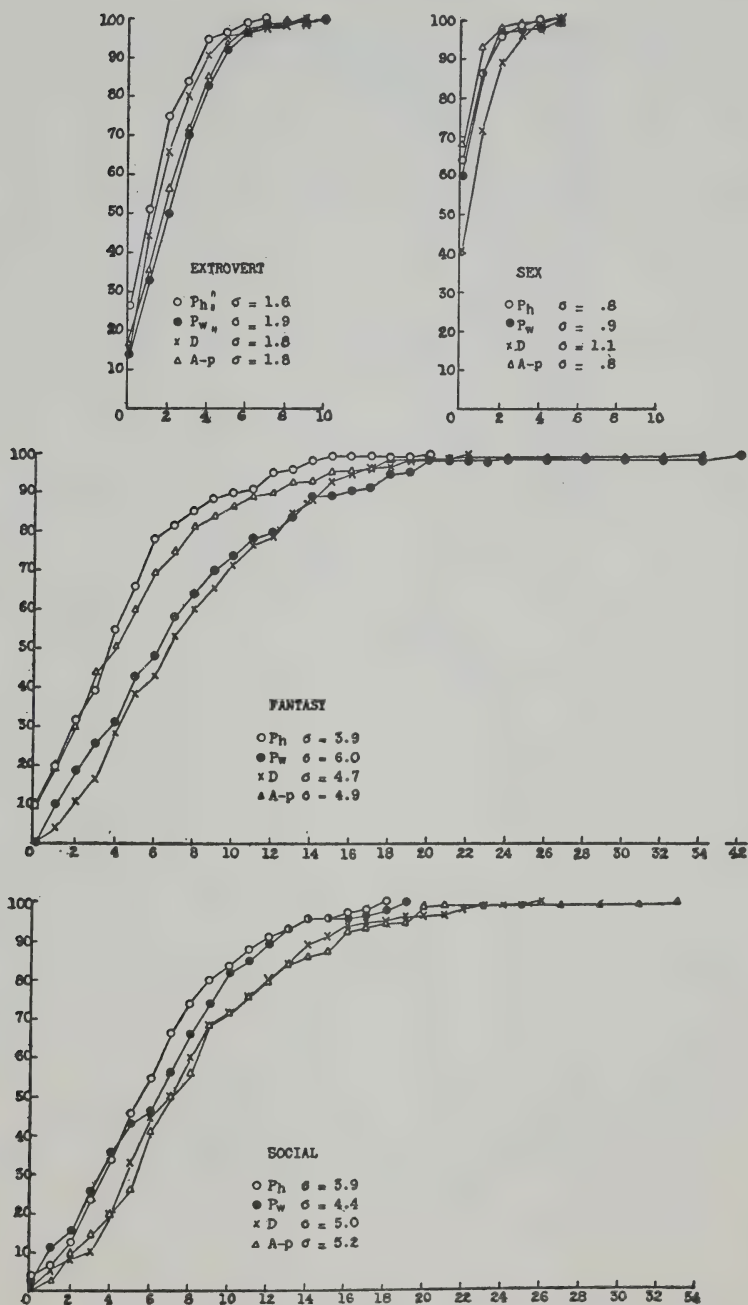


FIGURE 9

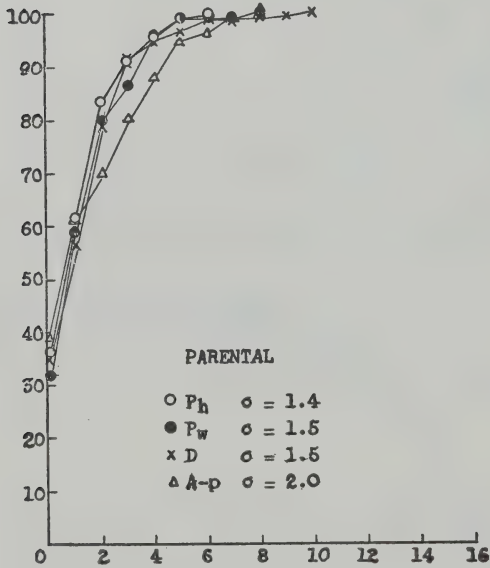
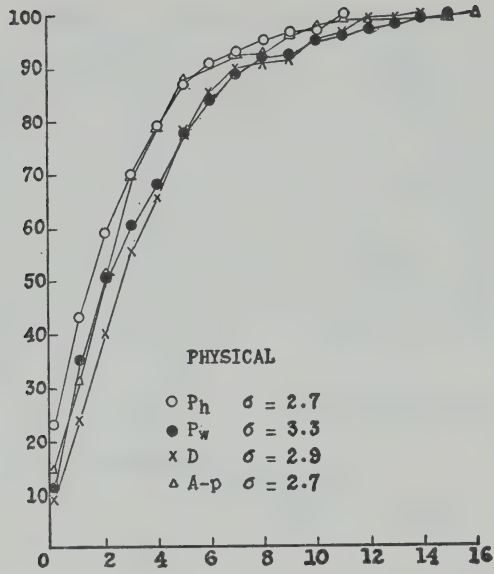


FIGURE 9 (continued)

	58	63	64	65	71	73	74	75	76	79	84	85	86	92	97	101
A-p	8	6	1	1	9	18	21	9	15	23	2	10	9	33	1	0
Ph	6	5	1	4	5	15	9	15	7	21	6	17	8	11	2	0
Pw	17	11	9	3	12	19	10	9	26	19	14	24	12	21	5	1
D	12	4	5	3	7	42	8	12	26	31	11	14	17	23	1	1
	103	104	105	106	108	111	113	114	124	127	129	136	139			
A-p	1	10	22	0	6	2	28	7	8	7	3	13	11			
Ph	3	6	12	5	7	11	26	3	9	10	8	8	22			
Pw	0	17	14	8	16	19	21	15	15	16	11	28	23			
D	10	8	17	3	17	12	18	16	28	27	8	12	20			
	141	142	148	149	151	153	156	158	164	168	174	177	184			
A-p	16	4	6	6	5	2	6	19	4	9	11	9	31			
Ph	10	7	7	3	8	4	10	13	13	10	7	16	15			
Pw	23	5	13	13	12	17	11	19	16	11	11	16	35			
D	8	13	22	33	22	14	6	18	23	17	25	28	22			
	185	186	193	194	197	199	201	202	206	211	214	219	220			
A-p	2	1	14	22	9	5	28	9	18	1	34	0	24			
Ph	0	4	11	9	8	1	12	15	13	1	18	1	15			
Pw	7	6	15	29	9	16	25	29	24	4	21	7	23			
D	5	8	11	14	19	6	22	24	24	4	29	1	18			

*Social.*

	1	2	3	10	12	13	15	17	18	25	28	30	33	36	41	43	44
A-p	23	14	14	38	31	28	13	15	38	29	37	41	23	1	11	12	21
Ph	14	26	26	25	16	26	18	21	24	18	28	22	24	16	11	12	23
Pw	15	22	22	22	34	17	20	19	21	19	27	19	24	10	17	17	21
D	38	6	23	24	21	24	23	16	23	23	20	24	16	5	15	10	19
	57	61	67	70	72	80	83	89	91	94	98	99	100	112	115	116	
A-p	20	1	1	29	72	32	6	31	39	19	36	18	2	10	24	0	
Ph	23	2	5	17	11	32	11	26	19	16	27	17	5	15	19	3	
Pw	19	11	2	23	8	26	5	22	22	25	29	12	7	24	18	3	
D	19	8	4	20	24	32	8	30	35	37	31	24	7	13	24	5	
	119	120	123	126	131	138	140	143	145	150	157	161	169				
A-p	1	15	3	1	1	14	32	1	35	83	6	24	35				
Ph	3	24	10	12	8	17	27	3	17	12	11	20	17				
Pw	4	18	7	7	7	18	19	9	22	16	13	30	18				
D	3	19	15	14	15	35	36	7	41	27	24	25	27				
	173	175	178	180	181	182	187	195	196	205	207	209	215				
A-p	0	8	38	40	33	12	41	18	30	29	22	21	2				
Ph	4	11	20	23	15	14	23	14	22	16	18	13	3				
Pw	4	13	27	23	26	18	25	26	24	20	19	11	7				
D	3	41	27	22	36	17	25	33	31	36	21	28	5				



*Physical.*

	5	7	9	27	34	37	42	48	49	50	56	60	62	66	78	82	87	
A-p	29	5	5	11	24	6	11	19	41	31	1	4	18	8	17	7	0	
Ph	14	7	3	3	10	3	20	19	17	14	2	2	10	13	14	9	1	
Pw	15	1	11	10	16	8	23	19	25	15	2	0	18	16	13	15	6	
D	9	2	5	6	11	9	20	24	28	18	0	1	21	15	33	7	2	
				88	90	93	109	110	117	132	133	135	144	152	154	155	160	
A-p					17	43	11	5	7	7	1	1	9	3	11	5	5	6
Ph					16	16	9	7	12	15	2	7	5	2	10	10	3	8
Pw					18	35	5	9	11	17	1	11	8	10	15	9	8	6
D					26	28	10	25	10	20	2	8	3	6	19	10	10	3
	162	163	166	176	179	189	191	198	203	204	208	210	213	216	218	223		
A-p		6	12	7	4	19	3	2	3	0	6	1	5	2	6	5	0	
Ph		15	11	11	9	5	5	6	3	0	11	10	3	5	4	9	2	
Pw		10	18	12	9	23	6	11	20	6	7	7	6	5	8	3	2	
D		18	18	8	5	32	12	13	10	5	18	15	2	8	2	8	8	

*Parental.*

	4	8	22	45	69	77	81	102	107	122	134	147	159	165	188	212	217	221
A-p	30	6	26	21	8	14	23	4	1	25	2	22	16	0	47	3	4	8
Ph	13	15	12	13	15	24	11	4	4	14	1	12	18	2	12	2	7	11
Pw	25	12	19	14	17	10	13	2	6	11	4	18	15	0	21	6	7	26
D	12	10	6	23	14	22	10	4	3	10	1	27	19	2	20	9	16	31

*Extrovert.*

	14	20	32	38	46	54	59	96	118	121	146	167	170	183	190	192	200
A-p	9	35	32	17	14	10	17	33	2	36	19	36	9	23	46	16	13
Ph	10	24	28	13	12	17	9	14	3	19	11	24	10	19	26	11	14
Pw	21	30	20	29	29	22	17	23	17	25	23	18	33	26	24	21	30
D	11	19	23	14	15	33	16	23	12	25	19	16	15	29	27	14	24

*Sex.*

	29	68	95	125	128	130	137	171	172	222
A-p	4	9	12	3	1	15	2	3	5	5
Ph	4	12	10	1	7	5	10	9	13	9
Pw	21	10	21	4	7	11	6	9	7	5
D	13	18	25	11	9	29	6	13	7	29

Items showing particularly large magnitudes of the four measures of agreement are as follows:

Using 40 couples as a boundary, the extreme items in the *A-p* measure are

Fantasy—	24	afraid of falling (45 <i>c</i> )
Social—	180	enliven dull party (40 <i>c</i> )
	30	keep in background (41 <i>c</i> )
	187	public speaking difficult (41 <i>c</i> )
	72	nonconformity (72 <i>c</i> )
	150	meet important person (83 <i>c</i> )
Physical—	49	stand smells (41 <i>c</i> )
	90	tears (43 <i>c</i> )
Parental—	188	mother dominant (47 <i>c</i> )
Extrovert—	190	like puzzles (46 <i>c</i> )

With 25 couples as a boundary, the extreme items in the *Ph* measure are

Fantasy—	47	worry, possible misfortunes (26 <i>c</i> )
	113	absent minded (26 <i>c</i> )
Social—	10	introductions at party (25 <i>c</i> )
	2	control temper (26 <i>c</i> )
	3	stage fright (26 <i>c</i> )
	13	difficulty starting conversation (26 <i>c</i> )
	89	be by yourself (26 <i>c</i> )
	98	stand criticism (27 <i>c</i> )
	140	like companionship (27 <i>c</i> )
	28	feelings hurt (28 <i>c</i> )
	80	talk and regret (32 <i>c</i> )
Extrovert—	190	like puzzles (26 <i>c</i> )
	32	leave tasks unfinished (28 <i>c</i> )

With 30 couples as a boundary, the extreme items in the *Pw* measure are

Fantasy—	23	nervous (31 <i>c</i> )
	24	afraid of falling (32 <i>c</i> )
	16	worry over humiliation (34 <i>c</i> )
	184	lack self-confidence (35 <i>c</i> )
Social—	161	hesitate in recitation (30 <i>c</i> )
	12	can't dismiss salesman (34 <i>c</i> )
Physical—	90	tears (35 <i>c</i> )
Extrovert—	20	get turned around (30 <i>c</i> )
	200	learn way easily (30 <i>c</i> )
	170	find way easily (33 <i>c</i> )

With 40 couples as a boundary, the extreme items in the *D* measures are

Fantasy—	73	day-dream frequently (42 <i>c</i> )
	145	self-conscious in recitation (41 <i>c</i> )
	175	dislike writing about self (41 <i>c</i> )

It is evident that the items for which complete agreement is most frequent are more numerous than those of any other type. These items, as might be expected, are those involving overt and fairly

conspicuous behavior. The items for which there is complete disagreement, per contra, are those involving either the inner or the private behavior. The husbands are particularly successful in predicting the wives' response on items chiefly of a social nature, while the wives' ability is shown rather more generally. In both these cases of partial agreement the behavior may be characterized as dependent upon inner reactions or feelings but expressing itself in such a way as to be perceptible to the spouse.

#### DIFFERENCE AND ERROR IN ITS ESTIMATION

The sum of the measures  $HNW_n$  and  $HnWN$  constitutes a measure ( $d$ ) of the actual amount of difference in response between the spouses. The number of items checked by each spouse ( $HC, WC$ ) is an estimate by each of the amount of that difference. These data may be evaluated with reference to the whole scale, the categories, and the items, affording another measure of the appreciation of maladjustment.

*The Scale as a Whole.* The  $d$  distribution of differences  $d$  for the scale as a whole is given in the following table:

15	20	25	30	35	40	45	50	55	60	65	70	75
1	3	2	7	5	16	16	10	15	21	11	14	4
80		85	90	95	100	105	110	115	120	M	$\sigma$	
16		4	6							1	59.5	17.3

The estimates of the spouses may be compared with the above:

	0	5	10	15	20	25	30	35	40	45	50
HC	5	14	10	25	12	15	11	15	7	5	10
WC	6	9	12	5	17	18	10	10	13	9	12
	55	60	65	70	75	80	85	90	95	M	$\sigma$
HC	7	3	4	2	2	3	1		1	32.0	20.3
WC	8	6	6	2	2	3	1		3	36.8	21.8

indicating a slight tendency for the wife to perceive more differences—we hope correctly.

It is evident that the actual differences have been enormously underestimated. Major responsibility for this result may be laid at the door of the investigator; the checking system is most probably at fault. It provides a situation wherein a premium is placed upon

the omission of a suspected difference—a psychological factor which was not detected until the emergence of the above results compelled attention to it. A preferable method would be to require each spouse to fill out a complete blank for the other, but this has obvious practical disadvantages so long as the blank must be administered in its present long form. From the inadequate estimates, however, some results of interest may be secured. Some of these may be found in the section on Homogamy; others pertain to the association between the ratio estimate of difference divided by the actual difference ( $HE$ ,  $WE$ ) and the amount of neuroticism in imputer and “impute.” The former coefficient is  $.22 \pm .05$  for the husband and  $.38 \pm .05$  for the wife. The latter is  $.07 \pm .05$  for the husband and  $-.01 \pm .05$  for the wife. The correlations of the same error measure with age are  $-.13 \pm .07$  for the husband and  $-.18 \pm .06$  for the wife; with duration of marriage,  $-.07 \pm .06$  for the husband and  $-.17 \pm .06$  for the wife.

The relation of  $HE$  and  $WE$  with number of children is shown in the distribution on p. 428.

The wives therefore tend to be rather more accurate than the husbands; the apparent decrease with increasing size of family may be a consequence of the slightly negative correlation with age, or it may be simply a chance variation due to too small populations.

The estimates of the spouses divided by the actual difference ( $HC/d = HE$ )<sup>1</sup> distribute as follows:

	0	5	10	15	20	25	30	35	40	45	50	55	60
HE	2	7	4	5	8	9	6	15	5	12	10	13	8
WE	2	4	3	4	4	5	3	5	9	9	10	13	14
	65	70	75	80	85	90	95	100	105	110	115	120	125
HE	8	5	5	5	5	7	3	1	5	1	1		1
WE	15	10	10	8	6	3	3	4	3	1	1	2	1
	130	135	140	145	150	155	M	$\sigma$					
HE							1	52.7	29.5				
WE								60.0	26.4				

<sup>1</sup>It must be noted that this is not strictly a measure of accuracy in estimating difference, since although the estimates are normally fewer than the actual difference, a difference may be ascribed where none exists. It is for this reason that the range of percentages is greater than 100. The measures may perhaps be thought of as affording means for a rough comparison between actual and estimated gross amount of difference.





The husband minus the wife percentages (*HE-WE*) distribute as follows:

-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	-10
1	3	1	2	5	4	6	6	8	7	5	8	7	15
-5	0	5	10	15	20	25	30	35	40	45	50	55	60
11	14	8	10	4	6	3	2	5	2	2	3		2
		65	70	75	80	85	M	$\sigma$					
		1					1	-6.7	30.4				

Thus the wife is slightly more likely to estimate the total amount of difference accurately, but there are large exceptions.

*The Categories.* The same measures (*HE* and *WE*) will be useful in comparing the estimates of difference for the categories. The husband and wife distributions for each category and the distribution of differences (*HE-WE*) are presented in graphic form, with means and standard deviations.

The extreme skewness of the *HE* and *WE* distributions make the constants much less satisfactory for purposes of comparison than the graphs given below; nevertheless the tendency of the wives to be a little more accurate than the husbands in estimating the amount of difference present is widest in four of the six categories. It must be recalled that these measures are to be interpreted as ratios between estimate and actual difference, not as percentage of individual items right. Relatively high efficiency will be noted in the Extrovert and relatively low efficiency in the Sex category. There is approximate equality as between the sexes in the scale as a whole, but the husbands appear to be substantially more efficient in the Sex category. High and low variabilities respectively will be noted for the categories Sex and Social, indicating many and few cases respectively of wide divergence between the efficiencies of spouses in appreciation of maladjustment.

*The Items.* The items will be kept in categories for discussion and comparison, as in the preceding chapter. For each will be presented the five measures *HNW<sub>n</sub>*, *HnWN*, *d* (sum of preceding), *HE* (husband's "percentage correct"), and *WE*. For the entire

	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	M	$\sigma$
Fa																							
HE	35	35	33	21	15	6	2	3	1							1						50.6	39.6
WE	18	33	32	27	29	8	3	1	1													58.3	32.0
So																							
HE	19	34	42	28	16	8	4	1														54.3	30.6
WE	16	23	37	36	22	12	5	1														61.3	31.4
Ph																							
HE	30	20	28	25	18	15	10	1	2		2		1									64.2	45.2
WE	24	27	29	31	19	15	5	1	1													59.2	35.2
Pa																							
HE	38	21	25	27	9	17	3	2		1												53.6	39.0
WE	31	17	25	26	14	20	2	4	1	2						1						63.2	47.4
Ex																							
HE	29	25	28	24	12	19	8	3	3				1									62.6	43.9
WE	27	23	21	28	22	16	9	3	2						1							65.5	44.6
Sx																							
HE	46	13	23	5	1	25	2	2	1	3	1				1						1	60.0	63.9
WE	56	12	18	7		25	2	2		3												49.5	48.8

	HE-WE																							
	—300	—280	—260	—240	—220	—210	—200	—180	—160	—140	—120	—100	—80	—60	—40	—20	0	20	40	60	80	100		
Fa													4	13	11	27	43	25	13	8	3	1	1	
So												1	1	10	12	29	30	36	21	7	4	1		
Ph													3	8	14	23	20	41	16	11	5	1	4	
Pa													1	7	10	17	8	49	15	11	2	2	5	
Ex	1											1	11	8	16	17	15	36	14	13	7	4	7	
Sx				1									10	2	8	6	1	52	12	13	2	15		

	120	140	160	180	200	220	240	260	280	300	M	$\sigma$
Fa	2						1				-7.2	47.2
So											-6.3	35.3
Ph	2	2		1	1						5.6	51.4
Pa	1				1						-4.6	60.0
Ex	1				1						.1	59.2
Sx		1								2	17.7	67.4

223 items there will then be given the distribution of differences *HE-WE*, then certain correlations (in which the unit is an item) designed to throw light on the questions of sex differences and the influence of neuroticism on the appreciation of difference.

*Fantasy*

	6	11	16	19	21	23	24	26	31	35	39	40	47	51	52	53
HNWN	9	19	33	33	20	19	23	1	32	14	16	28	28	4	17	21
HnWN	7	6	52	30	32	46	56	22	30	25	36	20	33	21	48	22
d	16	25	85	63	52	65	79	23	62	39	52	48	61	25	65	43
HE	81	60	57	33	36	68	47	113	47	26	29	48	56	36	40	44
WE	75	68	69	35	50	79	84	109	61	38	52	44	71	64	60	58
	55	58	63	64	65	71	73	74	75	76	79	84	85	86	92	97
HNWN	0	10	1	2	4	8	36	13	17	21	19	5	22	20	19	1
HnWN	11	26	20	8	4	17	35	19	14	32	49	23	27	17	47	6
d	11	36	21	10	8	25	71	32	31	53	68	28	49	37	66	7
HE	64	36	57	80	50	48	34	75	45	36	62	39	51	43	64	43
WE	91	67	76	40	63	68	34	78	39	60	65	53	65	43	64	57
	101	103	104	105	106	108	111	113	114	124	127	129	136	139		
HNWN		1	7	2	20	2	14	11	26	7	20	13	10	11	28	
HnWN		1	5	20	30	7	21	19	21	25	28	31	17	36	31	
d		2	12	22	50	9	35	30	47	32	48	44	27	47	59	
HE		0	17	95	62	44	40	43	102	59	19	30	37	45	44	
WE		50	25	100	54	100	65	70	95	28	44	52	78	74	59	
	141	142	148	149	151	153	156	158	164	168	174	177	184			
HNWN	12	9	16	15	12	12	14	9	27	17	15	10	22			
HnWN	21	12	16	28	28	21	8	38	13	19	26	39	52			
d	33	21	32	43	40	33	22	47	40	36	41	49	74			
HE	91	81	40	16	15	18	59	68	37	39	37	42	53			
WE	82	52	40	26	45	58	82	77	40	58	51	47	72			
	185	186	193	194	197	199	201	202	206	211	214	219	220			
HNWN	1	7	12	9	23	1	14	21	19	3	36	2	8			
HnWN	12	4	24	45	11	19	38	35	37	4	38	3	40			
d	13	11	36	54	34	20	52	56	56	7	74	5	48			
HE	23	45	67	87	47	60	67	34	43	43	49	100	73			
WE	61	45	72	68	56	65	73	59	66	57	64	60	81			

*Social*

	1	2	3	10	12	13	15	17	18	25	28	30	33	36	41	43
HNW <sub>n</sub>	27	9	15	43	31	40	25	23	35	41	26	35	34	11	24	21
HnWN	38	30	52	25	41	33	26	21	31	26	40	34	21	10	17	13
d	65	39	67	68	72	73	51	44	66	67	66	69	55	21	41	34
HE	52	100	72	62	85	66	47	75	63	58	56	67	64	62	51	67
WE	38	85	78	51	73	62	75	89	71	66	76	71	86	76	80	76
	44	57	61	67	70	72	80	83	89	91	94	98	99	100	112	115
HNW <sub>n</sub>	19	25	6	6	35	33	30	14	34	25	26	32	30	6	8	36
HnWN	47	35	6	3	21	12	53	4	34	42	55	42	26	12	32	28
d	66	60	12	9	56	45	83	18	68	67	81	74	56	18	40	64
HE	58	70	75	56	55	42	42	50	56	60	38	43	46	33	57	53
WE	73	57	50	44	66	44	64	61	53	52	49	78	55	55	75	55
	116	119	120	123	126	131	138	140	143	145	150	157	161	169		
HNW <sub>n</sub>			3	3	30	15	15	11	28	43	5	27	29	24	34	46
HnWN			5	7	29	14	11	15	30	28	11	54	26	23	34	14
d			8	10	59	29	26	26	58	71	16	81	55	47	68	60
HE			0	30	64	38	42	23	36	45	25	44	51	34	69	58
WE			75	40	58	28	38	42	45	45	62	46	67	30	54	47
	173	175	178	180	181	182	187	195	196	205	207	209	215			
HNW <sub>n</sub>	3	35	17	36	19	22	20	12	23	34	19	36	6			
HnWN	3	22	41	31	45	20	51	54	42	34	45	16	8			
d	6	57	58	67	64	42	71	66	65	68	64	52	14			
HE	83	26	59	69	41	55	60	41	28	47	62	40	43			
WE	83	30	74	60	61	55	72	64	62	53	58	48	57			

*Physical*

	5	7	9	27	34	37	42	48	49	50	56	60	62	66	78	82
HNW <sub>n</sub>	18	10	4	5	24	5	22	20	19	31	2	3	22	12	20	9
HnWN	21	3	14	22	20	15	33	36	44	27	3	3	24	25	34	20
d	39	13	18	27	44	20	55	56	63	58	5	6	46	37	54	29
HE	105	77	33	63	66	35	62	52	70	64	60	83	46	65	48	65
WE	103	62	78	74	84	60	64	59	60	75	60	50	67	51	28	65
	87	88	90	93	109	110	117	132	133	135	144	152	154	155		
HNW <sub>n</sub>			2	24	15	15	11	13	13	4	7	4	2	16	13	7
HnWN			5	27	73	14	27	15	30	2	15	13	13	21	14	18
d			7	51	88	29	38	28	43	6	22	17	15	37	27	25
HE			43	65	58	62	16	68	37	50	50	59	47	51	52	28
WE			57	57	75	55	26	36	56	33	41	88	73	54	48	48
	160	162	163	166	176	179	189	191	198	203	204	208	210			
HNW <sub>n</sub>	5	10	14	13	14	24	4	4	5	1	19	11	5			
HnWN	12	24	35	15	9	41	14	16	23	8	17	12	4			
d	17	34	49	28	23	65	18	20	28	9	36	23	9			
HE	71	53	61	64	39	34	44	60	43	22	42	39	100			
WE	82	62	65	75	65	52	50	35	61	44	31	35	89			

	213	216	218	223
HNW <sub>n</sub>	4	3	16	7
HnWN	11	6	8	3
d	15	9	24	10
HE	40	144	54	20
WE	53	122	37	40

*Parental*

	4	8	22	45	69	77	81	102	107	122	134	147	159
HNW <sub>n</sub>	16	11	15	21	14	19	20	5	4	14	2	23	27
HnWN	35	17	32	16	18	27	20	7	6	21	5	31	15
d	51	28	47	37	32	46	40	12	10	35	7	54	42
HE	63	79	70	65	78	52	57	67	50	69	57	39	62
WE	71	60	81	84	59	48	72	33	70	54	71	57	64

165 188 212 217 221

HNW <sub>n</sub>	3	28	9	7	16
HnWN	1	40	5	19	46
d	4	68	14	26	62
HE	50	57	21	42	21
WE	0	65	36	19	45

*Extrovert*

	14	20	32	38	46	54	59	96	118	121	146	167	170
HNW <sub>n</sub>	11	25	33	19	16	43	14	19	9	23	27	25	11
HnWN	24	53	39	33	35	16	28	39	14	40	25	37	36
d	35	78	72	52	51	59	42	58	23	63	52	62	47
HE	71	81	65	63	88	41	60	52	61	62	38	84	62
WE	80	53	76	67	59	49	60	64	52	59	73	77	72

183 190 192 200

HNW <sub>n</sub>	33	41	17	18
HnWN	32	39	32	39
d	65	80	49	57
HE	31	61	53	65
WE	54	56	65	68

*Sex*

	29	68	95	125	128	130	137	171	172	222
HNW <sub>n</sub>	6	24	16	5	10	24	9	7	13	15
HnWN	19	13	33	7	6	21	7	23	9	24
d	25	37	49	12	16	45	16	30	22	39
HE	84	62	47	42	62	38	62	33	64	18
WE	56	35	49	17	50	33	50	47	64	28



HE-WE distributes as follows for the 223 items:

—75	—70	—65	—60	—55	—50	—45	—40	—35	—30	—25	—20	—15	—10
1			1		1	2	4	4	10	17	19	37	27
—5	0	5	10	15	20	25	30	35	40	45	50	M	$\sigma$
20	25	15	13	9	3	8	4		2		1	—5.9	17.7

Again, no summary is likely to be as informative as the examination of the items themselves, aided, if desired, by the directories of items (1, pp. 25-26; 2, pp. 467-468, 475-476, 481, 485, 488). The mean last quoted indicates, as before, the slight superiority of the wives

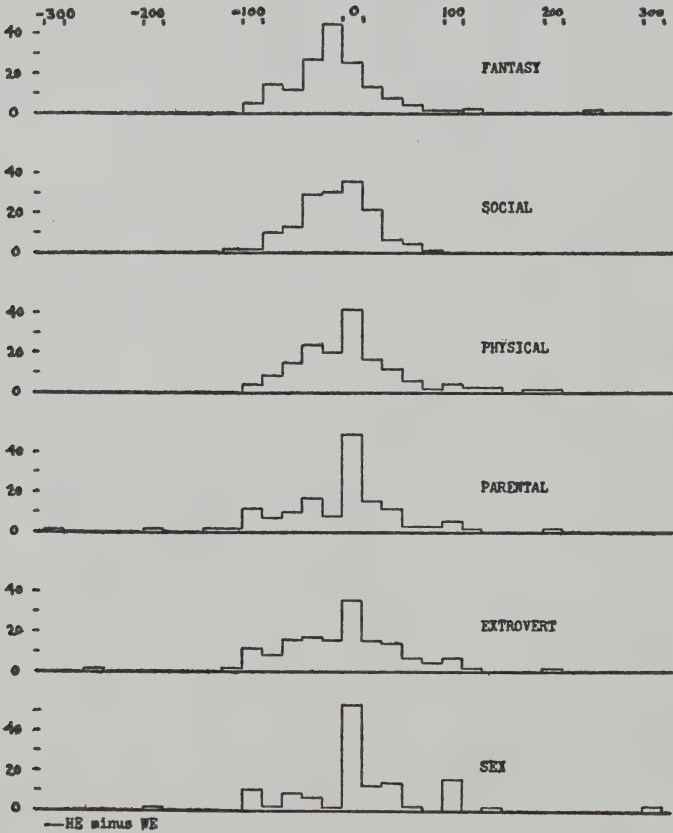


FIGURE 10

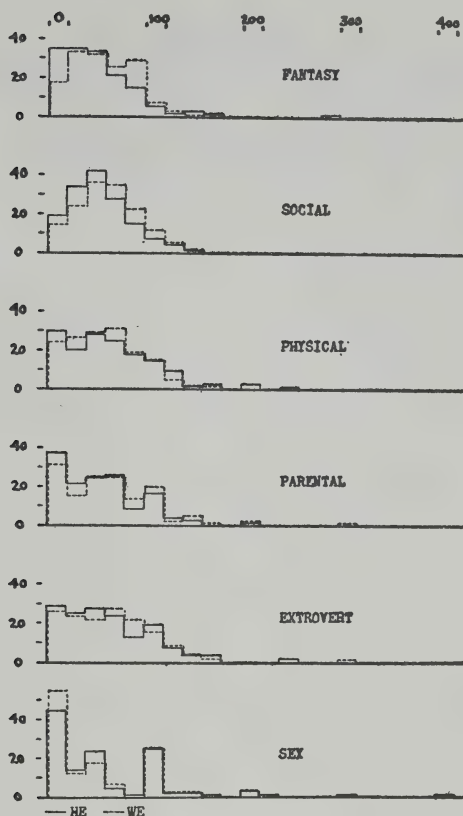


FIGURE 10 (continued)

in appreciation. The following correlations ( $r_d, HC$  and  $r_d, WC$ ) indicate the same thing, as well as an unexpectedly high relationship between the estimated and actual amount of difference. The other four coefficients show a rather high relationship between estimates of difference and "unique burden," in which, however, the wife shows a greater tendency to check the items on which she is neurotic than those on which she is normal, while the reverse holds with the husband:

$$\begin{aligned} r_d, HC &= .86 \pm .012 \\ r_{HnWn}, HC &= .77 \pm .018 \\ r_{HNWn}, HC &= .66 \pm .03 \end{aligned}$$

$$\begin{aligned} r_d, WC &= .93 \pm .006 \\ r_{HnWn}, WC &= .87 \pm .011 \\ r_{HNWn}, WC &= .69 \pm .02 \end{aligned}$$

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# A PSYCHOMETRIC STUDY OF 150 ADULT DELINQUENTS\*<sup>1</sup>

*From the Psychology Laboratory of the Worcester State Hospital*

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## I. INTRODUCTION

During the period January, 1929, to January, 1933, as part of a psychiatric study, 150 white male prisoners were examined at the Worcester County Jail by members of the psychological staff of the Worcester State Hospital. The examinations were conducted under the Massachusetts "Briggs Law," which provides that:

Whenever a person is indicted by a grand jury for a capital offense, or whenever a person who is known to have been indicted for any other offense more than once, or to have been previously convicted of a felony, is indicted by a grand jury or bound over for trial in the Superior Court, the Clerk of the Court in which the indictment is returned, or the Clerk of the District Court, or the Trial Justice, as the case may be, shall give notice to the Department of Mental Diseases and the Department shall cause such person to be examined with the view of determining such mental condition and the existence of any mental disease or defect which would affect his criminal responsibility. (General Laws Mass. Section 100 A, Chap. 123.)

The present report is based on as complete a schedule of psychometric tests as any previously published studies on adult prisoners which we have discovered.<sup>2</sup> Since most of the data on the results of psychometric investigations of prisoners are summarized by Pint-

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<sup>1</sup>Special acknowledgment is made to Miss H. O. Lasker, who made the preliminary analysis of this material.

<sup>2</sup>Among the most complete schedules used by others is that of Mennens (18) who gave the Vermeulen examination (a psychological profile about which we have been unable to obtain any definite information), Healy P. C. II and Porteus Mazes.

ner (23, pp. 374-397), no discussion of previous studies will be entered into except as necessary for comparative purposes.

The group studied has a mean age of  $25.7 \pm 0.7$  years (S.D.  $8.9 \pm 0.5$  years) with a range from 13 (there was only one case at this age level, the next lowest being 17) through 56 years. The mean educational level attained is eighth grade (S.D. two grades). At one extreme there were two subjects who had no schooling and at the other one who had an M.A. degree. Of the 15 foreign-born subjects, 6 had no schooling in this country. Those who had a language handicap of any sort were not given the Stanford-Binet test.

The crimes for which these prisoners had been indicted fall into the following rough classifications: thievery, 74 per cent; physical assault, 6 per cent; sex assault, 7 per cent; fraud, 3 per cent; miscellaneous (statutory crimes, arson, etc.) 10 per cent. Of the 150 prisoners, 143 were "recidivists" in the sense of coming within the meaning of the "Briggs Law" in any respect except the commission of a capital crime.

## II. METHOD

The psychometric examination consisted of a battery of tests composed of the Stanford revision of the Binet-Simon Test, the Worcester Formboard Series (28), the Healy Picture Completion Test II, the Porteus Mazes, and the Whipple-Healy Tapping Test.

The examinations were performed by female examiners in a room at the County Jail. When there were three or more subjects to examine during the same visit (which happened in less than half of the cases), the performance tests were sometimes given by one examiner and the Stanford-Binet by another. Quite detailed notes were made of the subject's attitude, cooperation being rated on a scale from *A* (enthusiastic interest and effort), through *E* (refusal to take the examination). The examiners, psychometrists on the staff of the Worcester State Hospital, had considerable experience in making the ratings as these were used in the routine reports of hospital psychometrics. It is recognized that these ratings are of only an approximate degree of accuracy and suffer from the inevitable limitations of rating scales.



## III. RESULTS

Results considered representative<sup>3</sup> by the examiners were reported in 101 cases, while 36 were considered wholly unrepresentative. In 14 cases, only parts of the examination were considered representative. The complete battery was not given in all cases because of language difficulty, physical defect, or, in a few cases, the necessity for expedition. All the results obtained for each test are reported upon. No tests are included which had coöperation ratings below C—. In order to make certain that there was little error in combining the representative and non-representative cases, the significance of the differences between the means of the representative and non-representative groups was calculated for each test. The

D

\_\_\_\_\_’s are as follows: Stanford mental age, 0.56; Healy score,

*σ<sub>diff.</sub>*

0.58; I Porteus (through XIV), 1.0; II Porteus (through Adult II), 0.67. None of the differences approach significance. The representative results were, however, in the case of every test higher than the non-representative ones.

The following results were obtained:

	N	Mean	S.D.
Stanford M.A.	141	12.4±0.2*	2.3±0.2
Stanford IQ (14-yr. basis)	141	88.6±1.3	15.9±0.9
Stanford IQ (16-yr. basis)	141	77.4±1.1	13.8±0.8
Healy P.C. II Score	136	51.0±1.6	18.7±1.1
I Porteus Mazes M.A. (through XIV)	116	12.9±0.2	2.1±0.2
II Porteus Mazes M.A. (through Adult II)	81	14.3±0.3	2.1±0.2
Worcester Formboards M.A.	137	13.1±0.2	2.4±0.1
Whipple-Healy Tapping Score	99	86.1±1.4	13.5±1.0

\*All errors presented on our own material are standard errors.

The mean IQ (on a 14-yr. basis) falls within the range of the dull-normal level of intelligence. An IQ of 70 or less was obtained in 10 cases and of over 110 in 11 cases. (No further analysis on the basis of IQ will be made, since all but one of the subjects were

<sup>3</sup>Under “representative” are included only the subjects given a rating of A to B—. In these the coöperation is at least of fair quality and the results, in the opinion of the examiners, are little influenced by the presence of somewhat diminished effort.

TABLE 1  
DISTRIBUTION OF MENTAL AGE RATINGS BY NUMBER AND PERCENTAGE

Test	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Stanford	1	0	0	0	4	12	20	17	35	25	10	9	2	2	4	141
Healy	1	0	0	0	3	9	14	12	25	18	7	6	1	1	3	100
		6*	7	13	31	31	17	6	5	6	7	10	21	7**		136
			4	5	10	23	13	4	4	4	5	7	15	5		100
Porteus	1	0	1	0	2	4	7	8	26	29	15	14	9			116
I	1	0	1	0	2	3	6	7	22	25	13	12	8			100
Porteus					1	2	0	5	11	11	16	16	8	9	2	81
II					1	2	0	6	14	14	20	20	10	11	2	100
Worc.			1	5	1	3	12	36	16	19	15	10	5	14**		137
Formboards			1	3	1	2	8	27	12	14	11	7	4	10		100

Each age level includes through to next—e.g., read "4" as "4.0 to 4.9."

\*These six cases are considered failures by the Healy scoring.

\*\*Classified as "Superior" ratings by the respective scoring systems.

16 years of age or over.) The distribution of the Stanford mental age ratings is given in Table 1. The "scatter" on the Stanford, using Woodworth's measure of scatter (33) gives a mean of 26.2 months (S.D. 7.9), with a fairly normal distribution.

An analysis of the Stanford results in order to determine the tests which are easiest and which most difficult indicates a consistently poor performance on memory tests: VII, 3 (digits forwards); X, 3 (designs); XII, 6 (digits backwards); XVI, al (memory for syllables); XVIII, 4 (thought passage). There is no consistency shown as to type of test which is easiest.

Because of the nonlinear relationship of the mental age equivalent and scores on the Healy P.C. II, it has been found advisable to concern ourselves primarily with scores. A distribution of mental ages on the Healy P.C. II is not unimodal. There are modal regions at the 9- and at the "over 16-" year levels. The distribution of scores, however, is definitely unimodal. The mental age equivalent of the mean score is 10.5 years. Six subjects failed (scores 8 and below) and seven received superior ratings (scores 80 or above).

As the adult mazes on the Porteus were not given in the earlier examinations, it was thought advisable to analyze the results, both including and excluding them. The mean of the Porteus ratings, including the adult mazes, is 1.4 years higher than that of the results excluding the latter. This is not surprising, since by the inclusion of the adult mazes a two-year higher rating is made possible with no corresponding penalty for failure. We have been unable to discover any discussion of the problem of the inclusion of the adult mazes other than that in Porteus (25, 186) which refers to the single adult test in the new maze series. Our mazes were rescored using the criteria suggested in this reference. (The assumption is made that the rule which is given for the new series holds for the adult mazes of the old series. It must also be pointed out that the new series has only one adult maze.) The MA rating by this new method of scoring is 13.2 (S.D. 2.3).

To determine the significance of the differences between the various test ratings the  $\frac{D}{\sigma_{diff.}}$  was calculated. No significant differences were found except between Tapping and both the Stanford

TABLE 2  
CORRELATIONS

	Age		Education		Stanford MA		Healy P.C. II		I Porteus MA		II Porteus MA		Worc. Fbs. MA		Tapping Score	
	r	$\sigma$	r	$\sigma$	r	$\sigma$	r	$\sigma$	r	$\sigma$	r	$\sigma$	r	$\sigma$	r	$\sigma$
Stanford MA	-.35	.07	.63	.04			.40	.07	.41	.06	.36	.07	.56	.06	.06	.15
Healy P.C. II Score	-.34	.07	.29	.12	.40	.07			.38	.07	.42	.09	.27	.07	.22	.09
I Porteus MA	-.09	.09	.30	.09	.41	.06	.38	.07			.94	.01	.33	.09	.12	.10
II Porteus MA	-.15	.10	.10	.10	.36	.07	.42	.09	.94	.01			.33	.10	.25	.12
Worc. Fbs. MA	-.22	.07	.22	.09	.56	.06	.27	.07	.33	.09	.33	.10			.24	.10
Tapping Score	-.23	.09	.26	.09	.06	.15	.22	.09	.12	.10	.25	.12	.24	.10		

and Porteus. (They were: Stanford—I Porteus 0.67; Stanford—II Porteus 1.66; Stanford—Healy, see below; Porteus—Healy, not computed but distribution shows obvious non-significance; Stanford—Worcester 0.33; Stanford—Tapping 3.8; I Porteus—Tapping 10.3; I Porteus—Worcester 0.09; Worcester—Tapping 1.2.)

Table 2 gives the various correlations. Those with age are all negative and range from  $-0.09$  to  $-0.35$ . Though the consistent trend is interesting, the coefficients are of such magnitude as would not invalidate the comparison of this with other age groups within the same general range. Correlations with education range from  $0.10$  to  $0.63$ . The highest coefficient is with Stanford. The only other coefficients which might be significant are those with I Porteus, Healy P.C. II, and Tapping. Among the intercorrelations between the various tests, the highest is  $0.56$  between Stanford-Binet and Worcester Formboards and the lowest  $0.06$  between Stanford-Binet and Tapping. It will be noticed that the coefficients run between  $0.25$  and  $0.50$ , the usual range of correlations between various types of mental tests. In so far as Tapping is concerned the coefficients run from  $0.06$  to  $0.24$ , the only possibly significant ones being with Worcester Formboards  $0.24$  and Healy P.C. II  $0.22$ .

The mean deviation of the Healy from the Stanford is  $-0.02$  years (S.D.  $3.5$ ), of I Porteus from the Stanford  $+0.7$  years (S.D.  $2.7$ ), and of the Worcester Formboards  $+0.4$  (S.D.  $2.5$ ).

Due to the preponderance of cases in the "thievery" group and the relatively small number in the other groups, any comparison as to differences in the mental level by types of crime would not be valid. However, mere inspection of the data reveals practically no differences between the types.

#### IV. DISCUSSION

Assuming an average mental age of  $14$  on the Stanford-Binet our group has a mean  $1.6$  years below this with a corresponding IQ  $11.4$  below. However, it must be remembered that an Army group of  $653$  "approximately unselected" English-speaking whites (22, p. 384) gave a mean MA on the Stanford-Binet of  $13.42$  years, with an

D

S.D. of  $2.85$  (22, p. 391).<sup>4</sup> The ————— of these two groups

$\sigma_{diff}$ .

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<sup>4</sup>This was the so-called "Experimental Group" who were also given the Alpha and Beta for purposes of standardization of the latter. Although,



is only 1.4, a nonsignificant difference. The percentage of feeble-mindedness on a 70 IQ-14-year basis is 11.9 in this group whereas our group has a 10.0 per cent incidence. On a 16-year basis the respective figures are 26.2 per cent and 28.3 per cent.

We shall now compare our results with those on criminals reported by others who used the Stanford and other language tests. The validity of comparisons between different kinds of tests is questionable, but they are here reported since they at least give some indication of general trends. Let us first compare the Stanford results. The mean Stanford mental age obtained by us differs little from those of others. Most differences in conclusions may be accounted for on the basis of differences in interpretation.

The median Stanford IQ of our group is 90.0, whereas the median obtained on 845 native whites by Root (27), who used the 16-year basis, is 77.4. Because of the nature of presentation of his data it has been necessary to exclude all foreign-born groups in order to eliminate negroes. We have had to limit ourselves to his native white group. However, little error arises from this source since only nine of our foreign-born subjects were given the Stanford. Converting his IQ to one on the 14-year basis gives 88.5, a result very close to ours.

Fry (7) in a study of 227 white subjects of the Eastern State Penitentiary of Pennsylvania found a mean IQ on the Stanford of 80.9 on the 16-year basis, with an S.D. of 15.8. This would be the equivalent of an IQ of 92 on the 14-year basis, which is slightly higher than the mean IQ of our group. Fry reports an average vocabulary<sup>5</sup> of 51.7 words (S.D. 16.6). This is of approximately

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as is pointed out in the Memoirs, the group is probably not a "genuinely unselected" group, still it is probably a fairly good sampling of the Army population. Since this group will be used later for additional comparisons, it is pertinent to point out that the mean age is similar to ours, the majority of cases falling into the same age range as ours, since the draft group under discussion were the 21-31-year group. It should also be mentioned that some question might be raised as to the representativeness of this group as far as the general population is concerned. The fact that officers were not included and that there were deferred classes must be considered in making judgments as to the representativeness of the sample (22, p. 830). However, since this is the only fairly satisfactory adult group examined by the Stanford-Binet we must fall back on it for comparative purposes.

<sup>5</sup>Fry used both vocabulary lists. We used only the first list, which would probably increase the difference between the groups (16).

14-year level, or about 0.7 year higher than the mean vocabulary rating of our group. He reports 22.4 per cent feeble-mindedness (below an IQ of 70 on the 16-year basis), which is 5.9 per cent lower than our corresponding percentage.

Doll's (2) group of 461 white prisoners at the New Jersey State Prison gave a median mental age on the Stanford-Binet of 12.3 years, approximately 15 per cent having an IQ of 71 or below on a 14-year basis.<sup>6</sup> Although the Stanford median is approximately the same as ours, the percentage of feeble-mindedness is somewhat higher.

A table in the *Memoirs* (22, p. 332 and p. 333) gives the distribution of Stanford-Binet IQ's for a group of 256 21- to 30-year-old "literate reformatory inmates" at Indiana Reformatory examined by Stone. (No other data are given.) We calculated for this group a mean IQ (presumably on a 16-year basis) of 76.9 (S.D. 13.74), with an equivalent MA of 12.3. This is practically the same as the mean of our group. The percentage of feeble-minded on a 16-year basis would be 38.7, and on a 14-year basis 12.5.

Grierson and Rixon (9) in an English study found in 200 male "ordinary prisoners" a mean mental age on the Stanford of 14 years. This is 1.6 years higher than the mean of our group. Their mean vocabulary is also 14 years, which is 0.7 year higher than that of our group. However, the study is too inadequately reported to lend itself to comparative purposes.

Erickson (3) in a study of 1690 adult white unselected inmates of the Wisconsin penal institutions by means of the Stanford-Binet found that approximately 22.2 per cent fell below an IQ of 70 on the 16-year basis. Our percentage on this basis would be 28.3. It was necessary to interpolate to find these approximate results, since Erickson used an IQ of 75 on the 16-year basis as his criterion for feeble-mindedness. The median IQ for his group falls just below 90 on the 16-year basis. This also is based on interpolation.

Two early studies using the Yerkes-Bridges scale are available. Analyzing Haines's (11) results in so far as possible by our standards we find 13 of his 87 subjects to have an IQ of 70 or below on

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<sup>6</sup>We have had to compute these figures from the data given on a group of 618 subjects, including negroes, and were unable to obtain other pertinent material for comparison.

the 14-year basis. This is 14.9 per cent of his group. It must be remembered that 21 of his subjects were negroes, whom it was impossible to eliminate because of the manner in which the data were presented. His average score is 77.1, which is the equivalent of a mental age of 13.6 years.

Gilliland (8) worked with 100 inmates of the Columbus Ohio Workhouse, 72 of whom were whites. Of the white group, 19.4 per cent fell below 61 points (an equivalent of an IQ of 70 on a 14-year basis). The mean and median scores of this group were 76, equivalent to a mental age of 13.4 years.

The data on Army Alpha examinations on prisoners offer difficulty for comparative purposes. In all cases there is the problem of translating Alpha scores to equivalent Stanford-Binet mental ages. In some studies there is the additional difficulty (1, 20) of the material being presented in percentage form without means. The two studies which give mean Alpha scores (10, 30) indicate higher mental age levels than those obtained in most of the studies using the Stanford-Binet. The data must, of course, be accepted with the mentioned reservation—that of the inadequacy of the table of equivalents.

Comparative data on the Kuhlmann-Anderson, Pintner group, Terman group, and unspecified tests are so difficult to evaluate that no attempt is here made to deal with this material.<sup>7</sup>

It is of interest to note a few points with regard to the specific items on the Stanford-Binet. As has already been indicated, our subjects had special difficulty with items involving memory. To eliminate the possibility that this might be due to the intrinsic difficulty of these test items, it is advisable to compare the only adult group available—that of the Army (22, p. 409). The short Stanford was given to 486 white soldiers.<sup>8</sup> This group showed the same difficulty

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<sup>7</sup>Those interested may find data of this nature in the articles of Kuhlmann (15), Mursell (21), Willey (32), Pintner and Toops (24), Frank (6), and Fernald (5).

<sup>8</sup>This group was the one used in the abbreviation of the Stanford-Binet scale and was composed of 324 males of the "Experimental Group" previously discussed and 162 others. A careful consideration of the nature of the group reveals what would not be expected in a standardization group—a distinctly unrepresentative sample! (Cf. Table 64, p. 407.) The group has a mean MA of 11.8 (S.D. 3.2) as compared with the mean of 13.4 obtained by the total "Experimental Group" ( $N = 653$ ). It has a 34.1 per cent incidence of feeble-minded (IQ 70—14-year basis) as compared with the "Experimental Group" percentage of 11.8. The group must therefore be considered as weighted towards the dull end and interpretations made with this in mind.

with memory problems as did ours, that is, at IX, 4 (digits backwards) and at X, 3 (designs). (It might be mentioned in passing that both groups did well on comprehension questions at X and XII.) The similarity in results in so far as this function is concerned at least indicates that our criminal group is not more deficient in this ability than the Army sample available. It should be pointed out, however, that some question has been raised as to the generally greater relative difficulty of (at least some of) the memory items on the Stanford. McFadden (17) found in his work on both normal and feeble-minded subjects that digits forwards (VII) and digits backwards (IX) were more difficult than the other tests at their respective levels. Wallin (31), who investigated normal and feeble-minded subjects at the VIII- and IX-year levels found that digits backwards at IX was the second most difficult task at that level. All these findings are consistent in indicating that the greater difficulty with memory items is due to the structure of the scale rather than to a special disability in our group.

In any discussion of the relative merits of the use of the Porteus and Healy P.C. II Tests with adult delinquents, such as that of Poull and Montgomery (26) and of Karpeles (14), it must be recognized that there is an almost insurmountable handicap to overcome. Nowhere is there available an adult normal group who have been given the Stanford, Porteus, and Healy. It becomes necessary, therefore, to do what we have done in this study—fall back on adult groups wherever available and assume that these different groups are more or less equivalent samples of the normal adult population, keeping in mind this source of error when making interpretations. We have found adult groups for the Stanford and Healy but none for the Porteus.

We may first compare our findings on the Healy P.C. II with the available normal adult groups given this test. There are two Army groups<sup>9</sup> (22, p. 402) whose tests were scored by a different

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<sup>9</sup>One is the so-called "Revision Group" (22, p. 402) composed of 134 American-born subjects apparently all white and the other a group of 227 Camp Lee subjects (22, p. 401). We cannot determine from the description given what the nature of the group was as far as color and nationality are concerned. It is likely that both negroes and foreign-born were included since the proportion of these in the population at this camp was large (22, p. 79).



method. The Healy scores were converted into scores of 0 to 32 in order to make them comparable to scores on the other performance tests given in the Army (22, p. 192). By means of the tables provided we reconverted the Army scores to original Healy scores. (The midpoint of the Healy score interval for each Army score was used.) The means obtained in this way were 31.1 (S.D. 15.5) for the "Revision Group" and 31.9 (S.D. 19.0) for the "Lee Group." The equivalent mental ages were 8.4 and 8.5 years respectively, whereas our mean score was 51.0 with the equivalent mental age of 10.5 years. The differences are highly significant, the

D

— being 9.6 and 9.4 respectively. This difference in favor  
 $\sigma_{diff.}$

of our prisoner group is not surprising since the Army groups were composed largely of soldiers who had either received D ratings on the Alpha or failed on the Alpha, Beta, or both. This lower level is corroborated by the only available Stanford-Binet ratings—those on the "Revision Group." They had a mean of 11.1 years (22, p.

D

403) as compared to ours of 12.4 years. The — between  
 $\sigma_{diff.}$   
these is 4.1, also significant.

Because of the poor quality of these Army groups for comparative purposes we must fall back on the only other adult group available—the original standardization group (12, p. 236). As nearly as we can determine from the data presented by Healy, the group is a fair sample. The author states that the "records of the feeble-minded and of those with educational advantages above high school are not included." He distributed the scores for the 234 male subjects between the ages of 16 and 50. This gave a mean of 66.0

D

(S.D. 16.45). The — between this group and ours is 7.9.  
 $\sigma_{diff.}$

Seventy-nine per cent of our group fall below the mean of the normal adult population.

It would thus seem that although at the intellectual level represented by the Army group adults do relatively more poorly on the Healy P.C. II than on the Stanford-Binet, still when compared with a presumably normal group our delinquent population does very



much more poorly. An attempt was made to determine the significance of the difference found between the Healy and Stanford in our group. Since the distribution of mental ages on the Healy is bimodal, the differences of the means could not be determined by the usual criterion of the standard error of the difference. "Student's"  $z$  method was used, taking each difference individually. The mean difference found was 0.31 years in favor of the Stanford,  $z$  equalling 0.0998. The corresponding  $P$  for 123 degrees of freedom is 0.16, so that the difference appears entirely fortuitous.

Thus, although we find no significant difference within our group between the Stanford and Healy, we find differences between our respective tests and those of presumably normal groups. Although the difference between the Stanford scores of our groups and the Army group is not significant, the difference on the Healy P.C. II between our group and the adult standardization group is decidedly significant in favor of the standardization group. We may find a very crude measure of the relative effect on the two tests in the index obtained by dividing our respective scores by those of the normal groups. The index of the Healy divided by the normal group Healy is 77 per cent, whereas that for the Stanford is 93 per cent. There are certain implications in our data, therefore, which would indicate a greater difficulty with the Healy P.C. II on the part of adult delinquents. Results would tend in the direction of corroborating Eccles' (4) results with delinquent boys, but not those of Poull and Montgomery (26) with feeble-minded "mal-adjusted" children.

The only study on adult delinquents which we have been able to discover in which the Healy P.C. II was used is that of Mennens (18). The mean score for his group was 37.7 (S.D. 23.6). This is considerably below the mean of our group. It must be remembered, however, that Mennens' work was done in Belgium. Aside from the possible effect of the foreign background on this particular test, the populations are probably not directly comparable.

The highest mean mental age in our battery of tests except for the Worcester Formboards was obtained on the Porteus Mazes. (If the adult mazes are included the exception need not be made.) But it must be remembered that between any two of the three tests we find no significant differences. Within our group we certainly

do not have any data to corroborate for adults the general findings of Poull and Montgomery (26) and Karpeles (14) as to the value of the Porteus with "maladjusted cases." (Cf. also 25, pp. 156-162.) Rather, whatever tendency exists is in the direction of corroborating Karpeles' finding of an almost significant difference in favor of the Porteus in the classification "thieves." Our group, as has already been indicated, is predominantly composed of persons charged with property crimes. The actual mean for this group is the same as for the total group. Of course, the studies were in all but one case concerned with children. It may be that what holds for delinquent children and adolescents does not hold for delinquent adults. In the one study reported on adults—that of Jarrett (13)—none of the cases had a Porteus Maze score above that of the Stanford. In our group, using from our data a sample of practically the same age range as he had (17 to 22 years) we found 31 cases with Porteus above Stanford and 19 below. The mean of the differences is  $+0.6$  year (S.D. 2.6). It should also be noted that the results are weighted in favor of lowering the Porteus rating since the scoring system used in this instance is the one we call "I Porteus." In our whole group of 116 cases, we find better scores on the I Porteus than on the Stanford in 68 cases, two cases with equal scores, and 38 lower scores. Unless the type of case with whom Dr. Jarrett is concerned is quite different from the type investigated by us, his strikingly consistent lower Porteus ratings should be viewed with caution.

An implication of our findings is that it is necessary to go behind "maladjustment" as represented, for instance, in delinquency and correlate the score with specific temperamental qualities. It is probably as much in the nature of the temperamental qualities involved in the respective groups (despite these all being delinquent) as in the age differences that the reasons for the different results obtained by us lie. We are not willing to emphasize this point since we did not make thorough personality studies of our subjects. Mere ratings without considerable qualitative data on personality are decidedly inadequate for any definite judgment on this point.

Mennens (18) also used the Porteus Mazes in his battery of tests. His scoring method was not conventional. We converted our scores to his and found a mean of 12.8 years as compared with his of 11.8

years. It must be remembered, however, that his prisoners were Belgian and comparisons are therefore dubious.

Since no data are available on a sufficient number of adults for the Worcester Formboard Series, it is necessary for us to assume a 14-year level as the probable mean for an adult group. On this basis our prisoner group falls 0.9 year below this assumed mean. On this formboard series they apparently do somewhat better than they do in the other tests of the battery but still somewhat lower than normals. However, it must be remembered that this generalization is made on the basis of means and that it does not meet the statistical requirements of significance.

The mean score on the Whipple-Healy Tapping Test is 86.1, which is slightly below that expected for persons in the age range of our group. As has been pointed out before, this is the only test which gave us significant differences from any of the other tests. Since we are not really dealing with mental age levels in this test, all we can say is that the prisoners seem to be less different from a normal group in this simple motor function than they are in the more complicated functions involved in the other tests.

The correlations between Stanford-Binet and Healy P.C. II found in our study may be compared with that of 134 soldiers (22, p. 404). The correlation coefficient is 0.65 compared to ours of 0.40. The Army coefficient was, however, based chiefly on presumably lower grade subjects, those who failed the Alpha, Beta, or both, and who were given the short Stanford. Worthington's (34) correlation between Stanford and Healy on 143 Institute of Juvenile Research cases differs only 0.01 from ours.

Between the Stanford and Porteus correlations from 0.52 to 0.84 have been found (25, pp. 146-164). The correlation obtained by us between Stanford and I Porteus is 0.41 and II Porteus 0.36 (Table 2). We are unable to account for the lower coefficients. However, the only available material on normal adults is that on 260 soldiers who were given the X-XIV year mazes as part of the Performance scale. The correlation with Stanford-Binet is 0.66 (22, p. 404).

The literature presents an even greater range of correlations between Healy P.C. II and Porteus Mazes—from 0.08 to 0.70 (25, pp. 146-164). These findings are those reported on children. Our

group gave a correlation of 0.38 with the I Porteus and 0.42 with the II Porteus Mazes (Table 2). Mennens (18) on his adult prisoner group finds a coefficient of 0.48 (S.D. 0.06). Using Mennens' scoring on the Porteus, the correlation for our cases is 0.39 (S.D. 0.05), which is fairly close.

Our results on the correlation between Porteus Mazes and Tapping Test, 0.12 (I Porteus) and 0.25 (II Porteus), are lower than the 0.48 of Morgenthau (19) whose data are derived from children.

Due to the great preponderance of property crimes in our group, it does not seem advisable to make comparisons as to the distribution of types of crime with studies made by others. We are, therefore, limiting ourselves to the comparison of the mental age level of our property crime group with that of groups with similar crimes reported by others. Grierson and Rixon (9) report mental age ratings on the Stanford of 14.4 and 14.1 for groups sentenced for these crimes. Root's (27) group of "predatory crimes," which comes nearest to our property crime group, obtains a mental age of 12.9 on the Stanford-Binet. Shrubsall (29) on an unnamed test obtains an MA of 8.6 for a group which is comparable to ours on the basis of crime. Pintner and Toops (24) using the Pintner Group Test obtain a mean MA of 10.0 for the "predatory" type of crime. We thus have a range of averages of 12.9 to 14.4 on the Stanford-Binet as compared to a mean of 11.8 in our group. In the case of the other tests, the results are in both cases lower than ours.

## V. CONCLUSIONS

Our group is not strikingly different from the only comparable adult group that has been given the Stanford-Binet test. The major difference lies in the fact that 51 per cent of our cases fall in the 10-12-year levels, whereas this is true of only 33 per cent of the Army Group. The difference between this normal and our prisoner group thus seems to lie largely in the preponderance of dull and borderline cases in the latter, and not in any difference in the incidence of feeble-mindedness. Both on the 14- and 16-year basis the percentage of incidence of feeble-mindedness in the two groups—Army and prisoner—by the generally accepted criterion of an IQ of 70 are respectively 11.9 vs. 10.0 (14-year basis) and 26.6 vs. 28.3 (16-year basis). Our results, though not quite corroborating



Murchison (20) who used the Army Alpha test, come closer to his finding of practically no difference between prisoners and Army than they do to the results of earlier studies (23, pp. 374-378) in which the incidence of feeble-mindedness was considered to be much higher. In this connection it must be emphasized that when the percentage of feeble-mindedness is being discussed it is on the basis of an arbitrary criterion—an IQ of 70. Whether this is a desirable dividing line is not pertinent to the present discussion. A statistical criterion (23, pp. 331-334) might perhaps be more satisfactory. What is pertinent is that apparently no greater percentage of "feeble-mindedness" is found in a delinquent than in a normal adult population. The difference seems rather to lie in the percentage of dull and perhaps borderline persons in the group.

The possible diagnostic value of the poor performance on memory tests is on further study eliminated, since the difficulty is apparently due to the intrinsic difficulty of these tests.

Our results with the Healy P.C. II test, taken in relation to studies on presumably normal adults elsewhere, would indicate the necessity for the further investigation of the particular value of this test for adult delinquents. In general, our results would indicate a relatively poorer performance of delinquents on this test.

The claim which is made for the Porteus Test as being of greater difficulty for delinquents and of diagnostic value as to personality traits in such a group is not substantiated by our findings on adults. Whatever evidence our material provides points in the opposite direction—that is, better performance on this test. Our results indicate the necessity for a finer discrimination as to the kind of delinquents and as to the temperamental qualities displayed by them.

Both the Worcester Formboard Series and the Whipple-Healy Tapping Test—particularly the latter—give results which are nearer the adult norms than do other tests. This would lead one to suspect that in motor functions, which these tests emphasize, there is even less to distinguish our prison group from normal adults.

In literate white prisoners there is a good deal to be gained from the use of performance tests, particularly if one is interested in the qualitative aspects of performance and personality which are frequently revealed by the subject in such test situations. The real value of performance tests will however not appear—here as else-



where—until an adequate analysis is made of the functions involved in such tests.

The correlations are in general not sufficiently different from other correlations found in the literature on tests of the kinds used to necessitate much discussion.

There is little we can say about the relation of mental level to type of crime. Considerable variation is found in the results obtained by different investigators. Some of this is undoubtedly due to the different tests used; other differences are probably due to varying criteria of classification. Our results are consistent with a few of the major studies in so far as property crimes are concerned—the only type of crime in our group which is represented by a sufficiently large number to allow for comparison.

## VI. SUMMARY

1. A psychometric study of 150 white male adult delinquents, 143 of whom were recidivists, is reported. Seventy-four per cent of the group were indicted for "property" crimes.

2. The tests used included the Stanford-Binet and a battery of Performance tests, consisting of the Healy P.C. II, Worcester Formboards, Porteus Mazes, and Whipple-Healy Tapping Test.

3. The mean chronological age was 25.7 years and the mean educational level eighth grade.

4. The mean Stanford-Binet mental age was 12.4 years. The means of the other tests were not significantly different.

5. Although the group does not differ significantly from an Army group given the Stanford-Binet in mean mental age, it has a greater incidence of subjects at the dull intellectual levels. The incidence of feeble-mindedness by the criterion of an IQ of 70 (both on a 14- and 16-year basis) is not different.

6. The Healy P.C. II test seems to offer greater possibilities for use with adult delinquents than does any of the other performance tests used.

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# UNE ÉTUDE PSYCHOMÉTRIQUE DE 150 DÉLINQUANTS ADULTES

(Résumé)

Un groupe de 150 délinquants adultes mâles d'un âge moyen de 25,7 ans, n'ayant reçu l'enseignement que pendant les huit premières années de l'école élémentaire en moyenne, presque tous des récidivistes, ont subi un examen psychométrique composé du Stanford-Binet, la Worcester Formboard Series, la Complétion de Tableaux Healy II, les Labyrinthes Porteus, et le Test du Tapping Whipple-Healy. L'âge mental moyen Stanford-Binet a été de 12,4 ans, les moyennes des autres tests n'étant pas différentes d'une manière significative. Bien que le groupe ne diffère pas statistiquement d'un groupe

de l'Armée à l'égard de l'âge mental Stanford-Binet, il a une plus grande incidence de sujets aux bas niveaux intellectuels. L'incidence de la faiblesse d'esprit selon le critère d'un QI de 70 n'est pas différente dans les deux groupes. Une évaluation des divers tests de rendement employés indique que le Test de Complétion de Tableaux Healy II semble offrir les plus grandes possibilités pour les délinquants. On ne compare pas les types des crimes puisque la plupart des cas ont été dans le groupe des crimes de "propriété." Des comparaisons avec les nombreuses études antérieures des délinquants indiquent que quand on établit un critère commun quant à la population et à l'évaluation que les résultats obtenus sont très semblables à ceux trouvés dans les études récentes.

SHAKOW ET MILLARD

### EINE PSYCHOMETRISCHE UNTERSUCHUNG 150 ERWACHSENER VERBRECHER

(Referat)

Einer Gruppe von 150 erwachsenen Verbrechern im Durchschnittsalter von 25,7 Jahren und mit einer Durchschnittsbildung von acht Schuljahren (8 grades), welche auch beinahe alle Rückfällige waren, wurde eine psychometrische Prüfung gegeben, welche aus dem Stanford-Binet, den Worcester Formbrettserien, der Healy Bilderergänzung II, den Porteus Labyrinth, und dem Whipple-Healy Klopfentest bestand. Das Durchschnittsalter nach dem Stanford-Binet war 12,4 Jahre; die Durchschnitte der anderen Tests waren nicht bedeutend verschieden. Obgleich die Gruppe sich nicht statistisch von der Armeegruppe im Alter nach dem Stanford-Binet unterschied, gab es eine grössere Häufigkeit der Vpn. auf den dummen Schichten. Die Häufigkeit der Geistesschwachen nach dem Massstab des IQ von 70 ist in den beiden Gruppen nicht verschieden. Die Bewertung der verschiedenen Leistungstests deutet an, dass der Healy Bilderergänzungstest II grössere Möglichkeiten bei Verbrechern zu bieten scheint. Kein Vergleich zwischen den Arten von Verbrechern wurde gemacht, da das Übergewicht der Fälle in die Gruppe der Eigentumsdelikte fiel. Vergleiche der zahlreichen Untersuchungen über Verbrecher weisen darauf hin, dass, wenn ein gemeinsamer Massstab wie Bevölkerung und Bewertung aufgestellt wird, die Ergebnisse denjenigen sehr ähnlich sind, die in Untersuchungen der letzten Zeit gefunden worden sind.

SHAKOW UND MILLARD

## DIFFERENTIAL FERTILITY\*<sup>1</sup>

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That the fertility of social classes differs has been well established. Pearson (74) as early as 1897 wrote, "fertility varies markedly from race to race, nation to nation . . . and class to class in the same race or nation . . ." (p. 67).

Bertillon (4, 5) found that data collected about 1890 in four European capitals indicated a marked difference between birth rates of the poorer and more wealthy districts.

Heron (41) concluded that

for London districts there is a very close relationship between undesirable social status and high birth rate . . . where there is more culture and education as shown by a higher proportion of professional men . . . the birth rate is least.

The net fertility of the lower status remains higher than that of the superior status.

The relationship between inferior status and high birth rate has practically doubled during the past fifty years . . . the birth rate of the abler and more capable stocks is decreasing relatively . . . (p. 21).

Dunlop (17), Elderton, *et al.* (21), Johnson (47), Jones (48), and Stevenson (88) in Great Britain, and Butt and Nelson (8), Chapman and Wiggins (10), Conrad and Jones (12), Holmes (44), Kiser (50, 51), Maller (56), Nearing (62), Notestein (63, 64, 65, 66), Ogburn and Tibbitts (66, 69), Osborn (70), Pearl (72, 73), Sydenstricker (93, 94), and Whetten (101) in this country are among those contributing to the evidence indicating a negative relationship of family size to social, economic, occupational, or educa-

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<sup>1</sup>This paper presents certain of the results from an analysis of the records of the University of Minnesota High School Personnel Office, made in cooperation with Prof. John E. Anderson of the University of Minnesota Institute of Child Welfare.



tional level. March (57, 58) observed a similar phenomenon in France, as did Lenz-von Bories and Lenz (54), Grotjahn (35), and Tietze (98) in Germany, and Barnouw (2) in Holland.

Rubin and Westergaard (82) found in Copenhagen that while the gross birth rate for marriages of more than 15 years' duration was slightly higher among artisans than among the professional group, the differential death rate was such that the net fertility of professional families was slightly greater. As Pearson has pointed out, the marriage rate of the different classes, which these authors neglect, as other demographers dealing with the same question frequently do, is probably the more important factor when class differences in family size are not large. Powys (79) furnished an excellent example of the effect of this factor in his Australian data. Using 1901 census records, he showed that according to the net fertility of married men occupational groups rank in the following order:

1. pastoral and agricultural
2. industrial
3. commercial
4. domestic
5. professional

His corrections for differential marriage rate change the order to:

1. industrial
2. professional
3. commercial
4. pastoral and agricultural
5. domestic

Griffing (33, 34), basing his conclusions upon samples from urban and rural China, stated that literate parents have on the average larger families than do illiterate, and that the net fertility favors the better educated group even more than does the gross fertility.

Japanese data reported by Takata (95) indicate a negative relationship between per capita income and birth rate by wards in the city of Osaka. He finds in Tokyo, however, a curvilinear relationship, the poorest and the richest wards being lower, with the highest birth rate in what he classifies as districts of low-average income. He is of the opinion that birth control is practiced in the latter city, but not to any considerable extent in the former.

Stevenson, from his study of British data (88), concluded that the difference in fertility of social classes was small prior to 1861; whereas, between that date and 1896 it increased rapidly. After 1896 he thought that there was a slight tendency for a narrowing of this difference.

Edin (18, 19) recently observed among the native population of Greater Stockholm a reversal of the usual trend. His data revealed that among families with incomes above 10,000 crowns there was 45 per cent greater fertility than among industrial workers. The relative difference is shown to be due to a greater drop in birth rate among those in poorer economic circumstances; there has been no increase in birth rate at any level during the past two decades. In a later paper Edin (20) reported that the lowest income group in the city of Grotenberg has a slightly higher fertility than the upper, but when the wives are classified according to date of marriage, the trend observed in Stockholm also appears among the more recently married of the Grotenberg cases. He sees in this evidence that a new type of differential fertility, the reverse of that commonly observed, is developing. Grotjahn (35) has quoted Röhmert (80) as finding in Bremen between 1901 and 1925 changes that appear to be producing a condition similar to that reported by Edin for Greater Stockholm.

Among the hypotheses advanced concerning the causes of decline in birth rate among certain groups, which, in general, is the basis of differential birth rates, is that of Gini (26, 27, 28), who favors a fundamentally biological explanation, namely, that there is a progressive diminution of the reproductive capacity of the generative cells. He holds that differential birth rates furnish a natural mechanism causing the disappearance of groups which have made their contribution to progress, and whose elimination is as necessary as is the death of the aged. He is of the opinion that the development of any group follows a parabola, and that no group may continue on a high level without the infusion of new blood.

Fisher (22, 23), on the other hand, explains the commonly observed negative relationship between socio-economic status and family size in terms of the social promotion of the less fertile. In support of this position he quotes data from Huntington and Whitney (46), who find, for the cases listed in *Who's Who in America*, a

positive relationship between amount of education of father and number of children. While it is by no means certain that education and ability are correlated positively in such groups, the assumption of such a relationship seems necessary to Fisher's reasoning.

Edin's observations raise some question as to the adequacy of either theory as a complete explanation.

Because of a distinct positive relationship between socio-economic or occupational level and measured intelligence has been demonstrated,<sup>2</sup> it was to be expected that family size and intelligence would be negatively related. Numerous studies published during the past decade have clearly established the presence of such a negative relationship in samples from a variety of sources. Counts (13), in a study of high school students, pointed out that lower ability tended to be more frequent in larger than in smaller families. Clark (11), working with a group of low ability in which the range was sharply restricted, obtained a correlation of  $-.08$  between IQ and number of sibs. The data were from 323 boys in a state industrial school. In 1923 Hart (40) tested all the children in the public schools of Davenport, Iowa, who were born in 1908. Using 589 cases, he found between IQ and number of children in the family a correlation of  $-.269 \pm .021$ . Chapman and Wiggins (10) published the results of a similar study based upon data collected in a New England town, where they tested 632 children in grades 6 to 8. Families in which a birth had occurred within five years were excluded to reduce errors due to incomplete families. Their data gave a correlation between IQ and number of sibs of  $-.33 \pm .024$ . Conrad and Jones (12) obtained between family size and average intelligence of sibship correlations of  $+.18$  ( $N = 61$ ) and  $-.20$  ( $N = 68$ ) for two groups from a New England town in which they tested the entire population. Lentz (52) assembled a large mass of data from a wide variety of sources, but employed records from tests not strictly comparable. The observed relationship between IQ and number of sibs was  $-.304$  ( $N = 4330$ ). Keller (49), whose data include records on all of the school children in Gross-Winter, Switzerland, found a negative relationship between number of sibs and intelligence. Lenz-von Bories and Lenz (54) reported a slight negative relationship between number of sibs in the family and

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<sup>2</sup>See Goodenough (29), Haggerty and Nash (37), MacDonald (55), Sandiford (84), Sirkin (85), Stoke and Lehman (89), and Yerkes (109).

estimated intelligence of children. Their results were based on records of 3302 children from a rural section of Germany.

Pearson and Moul (76), in a sample of Jewish immigrants coming to England principally from Poland, found the relationship between family size and teachers' estimates of intelligence to be of a negligible magnitude. The most extensive and thorough studies of the relationship between family size and measured intelligence of children made in England are the work of Sutherland and Sutherland and Thomson. These authors (92) found correlations of  $-.154$  and  $-.218$  in two groups of school children numbering 840 and 1084, respectively. Sutherland (90) also reported correlations on four groups of children whose fathers were miners as  $-.129$  ( $N = 1106$ ),  $-.26$  ( $N = 1990$ ),  $-.39$  ( $N = 919$ ), and  $-.115$  ( $N = 1071$ ). In a later paper the same author published correlations for two fatherless groups as  $-.188$  ( $N = 123$ ) and  $-.19$  ( $N = 724$ ). Control cases matched with the first group and not fatherless gave a coefficient of  $-.26$  ( $N = 116$ ), and a control from the same source as the second group, selected at random, gave  $-.23$  ( $N = 581$ ). Bradford (7), utilizing data from children tested during their eleventh year, correlated intelligence test score and number of sibs, the resulting coefficient being  $-.25 \pm .03$ . Dawson's (14, 15) data for 140 cases from completed families yielded a correlation of  $-.30$  between number of births and intelligence of children. However, the same group is reported as showing an  $r$  of  $-.10$  between number of living children and intelligence.

Terman (96) in his study of gifted children found a correlation of  $-.27$  between family size and IQ among 91 completed families. Van Alstyne's (100) data yielded a correlation of  $-.51$  between number of sibs and vocabulary score, and of  $-.41$  between number of sibs and mental age. Her data, limited to 75 cases, appear to come from a relatively heterogeneous group. Maller (56), in his study of the 310 health districts of New York City, found a correlation of  $-.446$  between *average* birth rate and *average* IQ. This figure, while of interest, is obviously not comparable with the above. Beckham (3), Dayton (16), Phillips (77), Rupp (83), Miller (60), Outhit (71), Hirsch (42, 43), White (103), and Willoughby (105, 106) may be mentioned among others who have presented findings indicating a negative relationship between family size and intelligence.



While there can be little question concerning the existence of a negative relationship between family size and intelligence in the populations of the United States and England, and perhaps also in Germany, the degree of relationship is not entirely clear. Among the correlation coefficients quoted there is a range between .18 and —.51. However, both extremes were observed only in very small groups, and in the case of the latter figure the extended range is probably responsible for the departure from the central tendency. In fact, if all those instances where there exist such obvious factors as extended or curtailed range, and also those instances where the data have included only small numbers of cases, are segregated, the remaining figures center slightly below —.30. Such factors as (1) the inclusion of incompleted families, (2) erroneous reports as to family size, (3) inclusion of test results not entirely comparable, and (4) unreliability of test results contribute to give a figure below that representing the true degree of relationship. Two other factors that are obviously pertinent, but which are not readily evaluated, are (5) frequency of childless matings at different levels, and (6) differences in marriage rate of various classes.

The nature of the relationship between family size and intelligence of children at various levels of the socio-economic or occupational scale has not been subject to extensive inquiry. The only research among those quoted above which dealt with a well-defined occupational group was that of Sutherland (90). Data presented by Huntington (45) and by Huntington and Whitney (46) indicated that among Yale students those with most ability came from larger families, on the average, than did those who made poor scholastic records, and that among Yale graduates the most successful have more children than the least successful. These authors also reported that the amount of formal schooling is positively related to number of children among the men listed in *Who's Who in America*. They failed to consider selective factors that may be largely responsible for the results they observed, and assumed that they have unearthed evidence that the superior are multiplying more rapidly than the mediocre. It is quite probable, however, that selection of ability is more rigorous among large families sending sons to Yale than it is among small, and it is almost certain that those persons with little formal education listed in *Who's Who* are in general individ-



uals of no mean degree of native ability. Woods (108) reported that among a group of Harvard graduates the unmarried showed a smaller percentage listed in *Who's Who in America*. He has not presented his data in a fashion that will permit adequate statistical evaluation. Sorokin (87) found a large family typical among the 372 American millionaires on which he gathered data. Maxwell and Huestis (59), on the basis of correlation of  $-.14 \pm .03$  between intelligence and family size for 707 University of Oregon students, concluded that differential family size is disappearing. Here both restriction of range and differential selection are improperly ignored. When these authors classify their subjects by occupation of father, negative correlations between family size and intelligence are found in the professional, trade, and skilled labor groups; whereas, in farm and forest, semiskilled and unskilled groups, where selection has no doubt been more rigorous, and probably upon a somewhat different basis, the observed relationship approximates zero. Thurstone and Jenkins (97), employing data on a group of 1854 clinic cases of extreme heterogeneity, observed a curvilinear relation between size of sibship and intelligence. "Size of sibship increases with diminishing intelligence quotient until the 50-60 group is reached, and from this point downward size of sibship rapidly drops off." When the group is divided at IQ 65, the peculiar truncated distributions which result show the correlation between IQ and number of sibs to be  $+.158$  for the 539 cases in the lower group, and  $-.188$  for the 1315 cases in the upper group.

The data presented below give additional facts pertaining to this question, as they are drawn from a group high in social and occupational status, and distinctly above the average in test intelligence. Records of 743 families that sent children to University High School, University of Minnesota, were available for analysis. Data on occupation of the father and education of the father and the mother were taken from a form filled out by parents in applying for admission of their children to the school. Family size was compiled from a questionnaire form upon which, soon after entrance, children list their brothers and sisters, and furnish certain other data concerning the home. Information on occupation of the father and on education of both parents was also available from this source, and has proved to be quite useful in verifying and interpreting records

obtained from parents on the application forms referred to above.

Intelligence quotients were obtained from scores on a battery of five group tests given to each student at or shortly before the date of his entrance to University High School. The tests employed were Army Alpha 8, Haggerty Delta 2, Pressey Senior Classification, Terman Group Test of Mental Ability, Form A, and Miller Mental Ability Test, Form A. The scores on each test were used to calculate intelligence quotients according to the instructions in the respective authors' manuals, and then, using the technique described by Miller (61) all other than those from Terman were converted into Terman equivalents. From the five quotients thus available for each child the middle value has been employed as a measure of intelligence.

Occupations have been classified according to the Minnesota Scale (30), which groups male workers in seven categories, ranging from professional to nonskilled labor.

The apparent interpretation made by the children when answering the questions concerning family size indicates that the figure available refers to the number of children in the family living at the time the report was made. While ages of the children at the time of reporting family size have not been tabulated in such fashion that an exact statement is possible, the mean age of various groups which included most of those here involved has centered between 14 and 15 years with 12 years as an approximate lower limit. Data collected under such circumstances from a population of the sort represented here would probably involve very few incomplete families, though no doubt occasional cases may appear. On the other hand, failure to include children not living has certainly created errors in the family size data, for which no correction has been made. The extent to which death rates in this sample are correlated with certain of the factors under consideration will obviously have a bearing on the extent to which such errors will influence the results.

Education of father and of mother has been expressed in number of years of formal schooling completed. No attempt has been made to recognize irregular and special training such as might be had outside public and private elementary and secondary schools, colleges, universities, and professional schools. This arbitrary practice, together with the errors that probably exist in the reports of parents

and children concerning amounts of parental education, affects in some degree the reliability of the data on education.

Occasional omissions or ambiguities in the records reduced to 719 the number of families for whom data on all variables were available. The degree of selection producing homogeneity with respect to these variables, as indicated by the accompanying standard deviations, must be taken into consideration in evaluating the results. While without a correction for restriction of range no rigorous comparison with figures from other sources can be made, it does not appear that such extremely low correlations can be explained solely on the basis of restriction of range. In the light of earlier findings these figures suggest that (1) due to peculiar selective factors this sample is not typical of the upper end of the social and occupational scale with respect to the relationships under consideration, or (2) the relationship between family size and the other variables here studied may be non-linear, with relationships approaching zero at the levels here involved.

TABLE 1  
THE CORRELATION OF FAMILY SIZE WITH CERTAIN OTHER VARIABLES  
( $N = 719$ )

Mean		S.D.	
1.	2.82		1.24
2.	118.65		12.65
3.	13.86		3.68
4.	12.48		2.53
5.	1.88		.95
$r_{12} = -.068 \pm .025$			
$r_{13} = -.020 \pm .025$			
$r_{14} = -.012 \pm .025$			
$r_{15} = -.012 \pm .025$			

\*The scheme of grouping provides only four categories in the above data on occupations. No correction has been made for broad grouping.

Subgroups including only those cases within single occupational classes, when treated separately, give results consistent with those set forth above. As will be seen in Table 2, the mean family size in the three groups in which most of the cases lie does not suggest a

TABLE 2

RELATIONSHIP BETWEEN FAMILY SIZE AND IQ OF CHILDREN WITHIN OCCUPATIONAL CLASSES

1. Size of family
2. IQ of child

Occupational class I	II	III	V
N            314	250	160	19
Mean <sub>1</sub> 2.83	2.74	2.93	2.47
S.D. <sub>1</sub> 1.09	1.22	1.54	1.15
Mean <sub>2</sub> 121.85	116.80	114.85	116.95
S.D. <sub>2</sub> 13.20	11.00	12.30	15.70
$r_{12}$ $-.144 \pm .037$	$-.002 \pm .043$	$-.051 \pm .053$	$-.149 \pm .151$

relationship such as has been so frequently observed, nor do the correlations in occupational classes II and III. On the other hand, the  $-.144$  appearing in class I is some 3.9 times its own P.E., and whatever weight may be attached to it favors an explanation of the lack of relationship within the total group on the basis of the peculiar nature of the sample. While the complex combination of selective factors which determine the nature of the group on which these data were collected defies ready analysis, it is entirely possible that the same combination is not at work in all of the occupational classes, and that families representing certain classes may be more nearly typical with respect to the traits in question than those representing others.

If the conditions observed in this sample are typical of the strata represented, these results, together with the evidence already quoted from Huntington (45), Huntington and Whitney (46), Maxwell and Huestis (59), Sorokin (87), and Woods (108), are sufficient to suggest the possibility that a shift such as Edin (18, 19) has revealed in Greater Stockholm may have had its beginnings in the upper levels of the population of this country.

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## LA FERTILITÉ DIFFÉRENTIELLE

(Résumé)

De nombreuses investigations faites en divers pays ont montré une relation négative entre la grandeur de la famille et de tels facteurs que les niveaux social, économique, d'occupation ou d'éducation et l'intelligence. Les résultats des études récentes, cependant, suggèrent que cette relation est en train de se changer.

Pour cette étude, on a employé des notations dans les archives de l'University of Minnesota High School, basées sur des familles d'un état élevé social et d'occupation. On a calculé les  $r$  Pearson avec (1) la grandeur de la famille, (2) le QI de l'enfant, (3) l'éducation du père (4) l'éducation de la mère, et (5) l'état d'occupation comme variables. On a obtenu les résultats suivants:  $r = -0,068 \pm 0,025$ ;  $r = -0,020 \pm 0,025$ ;  $r = -0,012 \pm 0,025$ ;  $r = -0,012 \pm 0,025$  ( $N=719$ ). Les  $r$  Pearson entre la grandeur de la famille et le QI de l'enfant dans les classes des occupations ont donné les valeurs suivantes: Classe I,  $-0,144 \pm 0,037$  ( $N=314$ ); Classe II,  $-0,002 \pm 0,043$  ( $N=250$ ); Classe III,  $-0,051 \pm 0,053$  ( $N=160$ ); Classe V,  $-0,149 \pm 0,151$  ( $N=19$ ).

Ces données montrent une relation négligeable entre la grandeur de la famille et l'intelligence des enfants pour les cas considérés. Il est douteux si ces résultats sont un indice de la vraie relation entre les variables comprises, parce que des facteurs de sélection ont pu conditionner les résultats.

FINCK ET NEMZEK

## DIFFERENTIALFRUCHTBARKEIT

(Referat)

Zahlreiche Untersuchungen in verschiedenen Ländern haben ein negatives Verhältnis zwischen Familiengröße und solchen Faktoren wie die soziale, wirtschaftliche, berufliche oder erziehlische Schicht und Intelligenz aufgewiesen. Die Ergebnisse der letzten Zeit weisen auf eine Aenderung dieses Verhältnisses hin.

Zum vorliegenden Studium dienten Protokolle aus den Akten der Universität von Minnesota für höhere Schulen, welche von Familien der hohen sozialen und beruflichen Lage gewonnen wurden. Die Pearson Korrelationskoeffizienten wurden berechnet mit (1) Größe der Familie, (2) IQ des Kindes, (3) Bildung des Vaters, (4) Bildung der Mutter, und (5) beruflicher Lage als Variablen. Die folgenden Ergebnisse wurden erhalten:  $r_{12} = -0,68 \pm 0,025$ ;  $r_{13} = -0,020 \pm 0,025$ ;  $r_{14} = -0,012 \pm 0,025$ ;  $r_{15} = -0,012 \pm 0,025$  (Anzahl=719). Die Pearson Korrelationskoeffizienten zwischen Familiengröße und IQ des Kindes innerhalb der beruflichen Klassen ergaben folgende Werte: Klasse I,  $-0,144 \pm 0,037$  ( $N=314$ ); Klasse II,  $-0,002 \pm 0,043$  ( $N=250$ ); Klasse III,  $-0,051 \pm 0,053$  ( $N=160$ ); Klasse V,  $-0,149 \pm 0,151$  ( $N=19$ ).

Diese Daten weisen ein unbedeutendes Verhältnis zwischen der Größe der Familie und Intelligenz der Nachkommenschaft für die untersuchten Fälle auf. Es ist fraglich, ob diese Ergebnisse ein Index des wahren Verhältnisses zwischen den untersuchten Variablen sind, weil auswählende Faktoren die Befunde bedingt haben dürften.

FINCK UND NEMZEK



# SHORT ARTICLES AND NOTES

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## TWO METHODS OF REPRESENTING THE DISTRIBUTION OF AN ATTITUDE IN A GROUP

LEONARD W. FERGUSON

In testing for attitudes there are two principal methods of constructing a frequency distribution which will be descriptive of a group. It may be constructed upon the basis of the individual scores obtained by each member of the group, or it may be constructed upon the basis of the relative popularity of the various statements which constitute the attitude scale. If the first method be chosen it is necessary to compute a score for each person in the group which will indicate his position upon a linear scale measuring the attitude variable in which the investigator is interested. From these individual scores a frequency distribution can be constructed which will indicate, by its ordinates, the relative number of people who receive the various individual scores. The individual scores are, if the scale is constructed according to the Thurstone technique, the median values of the statements which each subject indorses. They could be, however, the mean values of the statements which each subject indorses. These individual scores could also be obtained in several other ways, depending upon the type of attitude scale and the purpose of the investigator, but they need not be discussed as the concern of the present paper is with scales constructed and scored according to the Thurstone technique. It is quite likely, then, that the considerations and conclusions set forth in this paper might not apply to any other type of scale.

In order to construct a frequency distribution according to the second method, individual scores need not be computed. All that is necessary is calculation of the number of indorsements given to each statement by all the members of the particular group being tested. The ordinates of a distribution based upon this data would indicate the relative popularity of each of the statements in relation to the total number of indorsements given to all the statements.

In plotting a frequency distribution that particular technique should be followed which best fits the method of construction employed for the attitude scale in question. Thurstone, in deriving the scale values of the statements which make up his various and numerous scales, has a number of subjects sort the proposed statements into eleven piles. These eleven piles are arranged along a linear scale which is supposed to extend from "extremely opposed" toward the attitude variable which is being measured to "extremely favorable." These eleven piles are supposed to be equally

spaced throughout the attitude continuum. The various piles in which the statements are placed by the judges who are chosen to do this task are recorded, in order to provide data upon which to base the scale values. A graph is constructed for each statement upon the basis of its placements in the various piles. Any ordinate of this graph will indicate the percentage of times a certain statement was placed in a particular pile, and also in those piles which were "less favorable." As this graph is nothing more than a cumulative frequency curve it is relatively simple to plot the median point which becomes the scale value of the statement. By rather elaborate techniques criteria of ambiguity and irrelevance may be calculated which aid in the selection of statements which are to remain in the final scale.

It can be seen from the preceding discussion that the scale values of the statements will lie over a range of values from zero to eleven. One interval on the scale includes, then, all the values which lie between one whole number and the adjacent whole number. For example, a certain interval might include all the values between 1 and 2, or between 3 and 4, etc. In constructing the final scale, several statements are chosen to represent each interval as it is obvious that a scale of only eleven statements, one for each of the intervals, would not be of as much value as one with several statements representing each interval. Since the scale was constructed upon the basis of eleven "equal-appearing-intervals" it seems logical that any distribution based upon it should likewise be constructed with eleven intervals. All values which are plotted on such a graph will be plotted at the midpoint of each interval. The mean value of the statements which are included in any one interval may not lie exactly at the midpoint of that interval, but it will be so close that no serious error will result by so plotting the values obtained.

In following the first method, the values to be plotted on the graph are obtained by calculating the average percentage of times that individual scores are obtained in each interval, or the average frequencies of the individual scores may be computed. If the second method is chosen the values for plotting may be derived by computing the average percentage of indorsements that the several statements in the different intervals receive, or the mean number of indorsements received by the statements in the different intervals may be calculated.

By following the first procedure, it should be repeated, a frequency distribution has been derived which indicates the relative frequencies of various individual scores received by the members of a group in reference to the total number tested. If the second procedure is adopted, a distribution is obtained which indicates the relative popularity of the several statements in relation to the total number of indorsements.

If the purpose of the experimenter can be fulfilled by a graphic display

of the frequency distribution, the use of either method is justifiable. According to his desire he will choose whichever form of distribution will best serve his purpose. If he is interested in the relative frequency of individual scores in a certain group he will choose to use the first method. If, on the other hand, he is interested in the relative popularity of the statements in the group, he will choose to use the second method. If, however, the standard measures of central tendency and dispersion are desired, special precautions must be taken. It is to a discussion of such considerations that the reader's attention is now directed.

Only a word is necessary concerning the sigmas derived by the use of the two methods, but a consideration of the means must necessarily be more involved and more complete. The standard deviations computed by the two different procedures are clearly measures of different things. The sigma, as computed by the first method, indicates the relative dispersion of the individual scores about the mean of the individual scores of the group tested. The sigma as computed by the second procedure, however, indicates the relative dispersion of the popularity of the statements about the mean scale value of the statement which is supposed to be representative of the typical attitude of the group. This fact being clear, a discussion of the respective means will be in order.

As has been pointed out, the sigmas based on the two different distributions are clearly measures of different variables. Either mean, however, no matter by which method computed, purports to be the mean attitude of the group. Logically, then, one would expect the two means to be identical. If they always agree, regardless of the form of the two distributions, one would be justified in saying that the methods are equally valid. If the means are different, then one of the methods must be in error to some degree or the underlying validities cannot be identical. Our first concern must be, then, with the respective validities of the two methods.

To calculate a mean score by use of the first method all the individual scores obtained by the various members of the groups must, of course, be summed and then divided by the number of persons in the group. The individual score is, it will be recalled, either the median or mean value of the statements which the individual indorses. Whenever individual scores are considered in this paper it will be assumed to indicate the mean value of the statements which each subject indorses, rather than the median value. To arrive at the mean by use of the second method the number of indorsements given to each statement must first be calculated. Each value thus obtained must be multiplied by the scale value of the respective statement. These last figures are summed and divided by the total number of indorsements. This gives the mean value which is most typical of the group attitude. This method, of course, is based entirely upon the responses to every statement in the scale. Individual scores are not considered nor are they even computed.

In the first method, equal weight is given to each person's score no matter whether he indorsed 15 or 2 statements. Thus the number of statements checked has no influence in determining the group mean. In the second method, however, as the group mean is based upon the responses to each of the statements, one who indorses 10 statements contributes just twice as much to the group mean as one who indorses only 5 statements. Now, if a person, simply because he indorses more statements than another, be given a greater influence in determining the group mean, it would be tantamount to saying that his opinions were worth more than some one's else opinion. The writer can see no reason why one person's opinion should be rated more heavily than another's, in a group of persons of approximately equal abilities. An investigator must assume that each person has read over all the statements and has given his most careful judgment to each and every one. Just because he answers more of them in the affirmative is no reason for assuming that he has given greater thought to the questions than have the other members of the group tested. Indeed, it may be that one who has indorsed fewer statements has given greater consideration to each question as he more carefully selected the statements which were indicative of his attitude. As the second method has been shown to weight individual attitudes unevenly it must be concluded that it is not as valid as the first method.

There are certain conditions, however, in which the two methods will yield identical means. If every person indorses exactly the same number of statements, the two means will be identical. That this is so should be quite clear from the preceding discussion. Another condition in which the two means will be the same may be stated as follows. If, although the number of statements indorsed varies, the mean score of those persons who indorsed three statements coincides with that of those who indorsed four statements, and also that of those who indorsed five statements, etc., the means computed by either method will remain the same. Another condition may be stated as follows. The means will be identical if the mean score of all those who obtained scores below the group mean lies at a point which equals the deviation of the mean score of those who obtained scores above the group mean, from the group mean. The conditions just enumerated may best be understood by reference to Tables 1, 2, and 3. The numbers which appear across the top of these tables represent the scale values of the statements. The letters to the left of the table represent individuals. Each  $x$  represents the indorsement of a statement. Each figure in the column marked  $s$  represents the sum of the scale values of the statements endorsed by that person, while each figure in the column labeled  $f$  represents the number of indorsements made by that person. In the column marked  $i$  appear the individual scores. This column is summed and divided by the number of persons in order to get a mean of the

TABLE 1

	1	2	3	4	5	<i>s f</i>	<i>i</i>
A	x	x	x			6/3 = 2	
B		x	x	x		9/3 = 3	
C	x	x	x			6/3 = 2	
D			x	x	x	12/3 = 4	
E	x	x	x			6/3 = 2	
<i>n</i>	3	4	5	2	1		13/5 = 2.6
<i>p</i>	3	+8	+15	+8	+5 =		39/15 = 2.6

TABLE 2

	1	2	3	4	5	<i>s f</i>	<i>i</i>
A	x		x		x	9/3 = 3	
B			x			3/1 = 3	
C		x		x		6/2 = 3	
D	x	x	x	x	x	15/5 = 3	
E	x	x		x	x	12/4 = 3	
<i>n</i>	3	3	3	3	3		15/5 = 3
<i>p</i>	3	+6	+9	+12	+15 =		45/15 = 3

TABLE 3

	1	2	3	4	5	<i>s f</i>	<i>i</i>
A				x		4/1 = 4	
B		x				2/1 = 2	
C				x	x	9/2 = 4.5	
D							
E	x	x				3/2 = 1.5	
<i>n</i>	1	2		2	1		12.0/4 = 3
<i>p</i>	1	+4		+8	+5 =		18/6 = 3

individual scores. In the row labeled *n* appear the number of indorsements given to each statement by the whole group, while in the row signified by *p* appear the values in row *n* multiplied by the scale values of the respective statements. In order to compute a group mean this row must be summed and divided by the total number of indorsements. This will be recognized as the second method previously mentioned. Each of the diagrams represents one of the conditions above described in which the means computed by the two methods will be identical. In Table 1 it will be observed that every person has checked the same number of statements, hence the two means are the same. In Table 2 each person has checked a different number of statements yet the group means remain



the same because the mean score of everyone coincides. In Table 3 the group means are identical, for it can be seen that the mean score of those who obtained scores above the group mean deviate as much from it as does the mean score of those who obtained scores lower than the group mean. All this discussion may be summed up by saying that if there is no correlation between the number of statements indorsed and the score received, the means computed by both methods will be identical.

Throughout this paper, the individual scores have been assumed to be the mean value of the statements that the subject indorses. If such were invariably the case, the conclusions above presented would hold absolutely in every case. If, however, the median value of the statements indorsed is considered to be the individual score, the conclusions will not hold so unswervingly, as the median is not so susceptible to mathematical treatment as is the mean. There will perhaps be a small discrepancy between the means as computed by the two methods even though one or more of the above conditions is fulfilled. The fulfillment of one of them will, however, cause them to approximate one another, so that greater confidence can then be placed in the mean as computed by the second method.

A word should be inserted as to the method of calculating the scale values of the statements which constitute an attitude scale. The methods commonly in use combine the responses of a number of judges without first computing individual scores. According to the preceding discussion, the scale values as derived in this manner would be in error were it not for the fact that the first condition which was mentioned as necessary to cause the two means to be identical is fulfilled. Every person judges the same number of statements, and judges them an equal number of times. Consequently a method which does not involve individual scores is quite legitimate to use for this purpose.

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## RACIAL DIFFERENCES IN LINEAR PERSPECTIVE

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There is a difference in the presentation of perspective between Oriental and modern Western art. Oriental art is characterized by a total or partial absence of linear perspective and by an absence of shadows. The long tradition of the great Oriental art has always supported these characteristics of non-realism, but one may ask whether the tradition has not been influenced by physiological factors. Racial differences in perception were pointed out by Thouless (9) as responsible for the non-realism of Oriental

art. He cited experiments which he had conducted with a group of 20 Indian students (mean age  $22.0 \pm 2.01$ ) and 49 British students (mean age  $21.45 \pm .96$ ) as evidence. The Indian students showed a stronger tendency to perceptual constancy of size than the British students.

The seen shape of an object is a compromise between the true perspective of the object and its orthoscopic appearance. This fact, usually known as the tendency to "constancy of size," has been called the "phenomenal regression to the real object" by Thouless. The mean index of phenomenal regression for the Indian group was .81; it was .68 for the British group. The difference was found to be statistically significant. Therefore Thouless drew the following conclusions:

1. There is a real racial difference in perception between the British and the Indians.

2. This suggests that the absence of perspective and of shadows in Oriental art is determined by a real difference in perception and not merely by a tradition of "symbolic" representation.

Evaluating the psychological strength of these conclusions one must keep in mind the fact that the distributions of the mean individual indices of phenomenal regression of both groups overlapped completely; the range of the Indian indices was narrower and they were gathered around a higher value (.81). Furthermore, the conclusions seem to imply that the artist painters are a fair sample of their respective populations with regard to perception, that the degree of phenomenal regression is rather non-variable, forcing upon the artist a rather permanent perceptual habit, and that the artists attempt to imitate nature in their work.

The psychology of art is an interesting but poorly developed branch of science. Therefore I would like to be permitted to make a few comments on Thouless' paper.

1. Experiments have shown that the "constancy of size" phenomenon is easily influenced by a number of various factors. Unlike the known visual illusions, the "constancy of size" varies within large limits according to changes in the conscious attitude. In Klimpfinger's (4) experiments, performed under conditions comparable with those of Thouless, the subjects were asked to adopt two different attitudes; the synthetic attitude consisted in examining carefully the shape and proportions of the object regardless of its position in space; the analytic attitude consisted in studying the appearance of the object as changed by linear perspective. The indices of phenomenal regression were significantly different for both attitudes from the very start of the experiments. The difference was increasing as the experiments proceeded (15 tests in 13 days). In the synthetic attitude, favoring constancy of size, the mean index was 61.2 on the first day and 84.9 on the last day; in the analytic attitude it was 27.4 on the first and 20.4 on the last day (five subjects). The averages for the whole period

were 72.8 and 25.5 respectively on a scale with end values of 100.0 and 0.0. Artist painters changed from one attitude to another with the greatest facility and they had the most extreme obtained individual indices. The difference between the two consciously adopted attitudes was greater than that between the Indian and British students. Thouless' and Klimpfnger's formulas are the same except that Klimpfnger's values are multiplied by 100.

In the usual conditions of life we look at objects chiefly for the purpose of locating them, paying no attention to the changes in appearance caused by linear perspective. We are not aware of these changes within certain limits unless we make a conscious effort to notice them. Thus the practical need of recognizing an object counteracts the effects of perspective. When, as usually is the case, we see a chair in such a position that none of the corners of its seat is projected upon our retinae as a right angle, our perceptual phenomenon of the seat is nevertheless a rectangle (6, pp. 284-298). The child, in particular, is unable to estimate its immediate impressions of form independently from the influence of previous experience when the object was seen orthoscopically.<sup>1</sup> But, when unacquainted with the object, both children (5) and adults (10) see the objects in better perspective. Klimpfnger found that the index of phenomenal regression of three-year-old children was small (13) and that it increased with age, reaching the peak between ten and fifteen years (with a value of 50), when it began to drop to the low level (of 12) in older adults. These figures were based on experiments conducted with 313 subjects, 180 male and 133 female; there were from 16 to 20 subjects in each age group from the third year on. The tendency to "constancy of size" may be connected with eidetic imagery which reaches its culmination at the age of ten to fourteen.

The breaking point at this age seems to be connected with the development of abstract thinking. At this age the child begins to understand the laws of perspective and thus becomes able to improve his three-dimensional vision. There is evidence to support the view that the greater the maturity of a person the easier it is for him to see things in true perspective (2). We can also say with a reasonable degree of confidence that the tendency to phenomenal regression is related to intelligence, the less intelligent subjects showing the greater tendency to perceive the "real," orthoscopic characters of objects (8).

The degree of phenomenal regression to the object changes not only from individual to individual for the same test but changes greatly from test to test for the same individual (8). Another very important factor in stereoscopic vision is the aerial perspective (changes in illumination and

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<sup>1</sup>Karl Bühler—quoted by Koffka (6).

accompanying changes in color shades; the more distant an object the less colorful). Pouillard thinks that the elements of aerial perspective contribute much more to our feeling of the depth of space than the elements of linear perspective (7). Katz has found in his extensive studies that it is impossible to establish equality between two surfaces differently illuminated (3). Thus distances are differently appreciated under different light and topographical conditions. The climate and geography of a country influence therefore three-dimensional vision. Compare the hazy spaces in the paintings of a Van Eyck with the lucid linear perspective of the Italian quattrocento. It may well be that the slight differences in phenomenal regression between Indian and British students can be attributed to differences in aerial perspective in those countries.

Vision in true perspective, then, is not a natural phenomenon but it depends largely on education, environment, maturity and intelligence, the nature of the task, and conscious attitude. One would expect that the indices of regression are normally distributed and, indeed, we find that the empirical distribution is not widely different from that indicated by expectation from a normal distribution (8). Many of the potent factors determining the degree of the phenomenal regression are transient or temporary, and consequently changes in phenomenal regression can hardly be ascribed to permanent biological or racial agents.

2. While it is difficult to associate small differences in phenomenal regression with racial characteristics, it is, a fortiori, an impossible task to prove that the absence of linear perspective and of shadows in Oriental art has anything to do with racial psychology. Let us remember that linear perspective and shadows in art are a contribution of ancient Greece and that we find them only wherever the art of ancient Greece made itself felt. We find a complete disregard of linear perspective in children's and primitive art, be it in the Orient or in the West. One would consider naïve primitive art a better indication of racial characteristics than the ripe art of great masters, for whom painting was an intellectual and conscious mental process. In fact, linear perspective has established itself in Europe only since the Italian quattrocento which gave the theoretical foundations of drawing in perspective. We do not see it yet in the work of the great Giotto, in the paintings of the early Netherland masters, in the Burgundian miniatures, or in the work of the German guild artists.

Linear perspective opened the road to naturalism and to a general tendency to imitate nature in art. From the time of the Italian Renaissance on, purely aesthetic principles had to yield to a general rule of agreement with nature. Painting gradually became a scientific activity, using a complicated scientific apparatus built on the laws of geometric perspective, anatomy, and physiology of colors. The number of specific rules which



the artist was supposed to follow was increasing rapidly and finally brought Western art to a very low level in the nineteenth century. Automatically applied rules took the place of artistic imagination and depth of feeling. The revival of art in modern times was preceded by a violent attack upon linear perspective and all realistic principles. One has realized that the purpose of the artist is not to compete with the photographic apparatus.

Oriental art frankly rejected imitation of nature. This fact has been very well explained in a recent book on *The transformation of nature in art*, by Ananda K. Coomaraswamy (1). The author has supported his opinions by numerous literary evidences from Chinese and Indian documents. "A multitude of passages could be adduced to show that it is not the outward appearance as such but rather the idea in the mind of the artist or the immanent divine spirit or the breath of life that is to be revealed by a right use of natural forms (14). . . Even when a horse is to be modelled from life we still find the language of Yoga employed; having concentrated, he should set to work (7)". Characteristic is the complaint of a Chinese critic who said with reference to his period of degenerate art: "Those painters who neglect natural shape and secure the formative idea are few (15)". According to Oriental theories, the work of art must reveal "the operation of the spirit in life movement . . . the painters of old painted the idea and not only the shape . . . (the task of art is) to represent divine spirit by means of natural shape . . . For the East as for St. Thomas, *ars imitatur naturam in sua operatione* (15)". E.g., Michelangelo can be said to have imitated nature in its creative power and not in its outward forms, when he painted the human figures in the Sistine chapel; these splendid figures do not violate any biological principle of human bodily structure, although no human can even approach their perfection.

With special reference to painting, it should be noted that in India "painting is thought of as a constricted mode of sculpture; relief, which may also be colored (144)". Coomaraswamy gives many references to prove that painting in India, although actually applied to plane surfaces, was nevertheless regarded as a kind of solid representation. Thus it can be easily understood why the Indian painters not only disregarded the principles of, but did not even feel the need for linear perspective. Of course, from the aesthetic point of view, no one variety of perspective can be regarded as superior to any other. The definition of perspective reduces itself to "means employed to indicate the existence or distribution of objects in space" (1, p. 147).

Another reason why the experiments cited previously are not valid to explain differences in art is that they made no distinction between geometric and optical perspective. A straight line does not always appear straight, as we well know from optical illusions. In art, the laws of optical and



not of geometric perspective should be followed. The ancient Greeks realized it and showed a remarkable sensitivity to optical perspective in their best work. In the Parthenon the columns are not spaced equidistantly in order to appear equidistant. The face of the Venus of Milo is asymmetrical geometrically in a way to appear optically symmetrical. Modern artists are not so successful in solving the problems of optical perspective. One of the most conspicuous examples, perhaps, is the McGraw-Hill building in New York (on West 42nd St.); it appears to be wider at the top than in the middle; it gives an expressionistic impression which was not intended by the architect.

3. The reason for the numerous ornaments in Oriental art is an artistic consequence of lack of linear perspective. It was necessary to fill in spaces which otherwise would look empty. In drawings made according to the laws of true perspective there is no need of filling out of spaces with decorations, because one well drawn line will suffice when it gives the feeling of spacial depth. The representation of a three-dimensional space on a two-dimensional surface is optically satisfying without additional decorations.

The subjects in Thouless' experiments were educated men who certainly had come in contact with the art of their respective countries since early childhood. Inasmuch as art deeply influences perceptual habits, one would feel inclined to say that the difference in phenomenal regression between Indian and British students was an effect rather than a cause of the differences between Oriental and Western Art.

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## THE FACTOR OF SEX IN TESTIMONIAL ACCURACY

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A survey of all controlled experiments in the field of memory recall reveals 26 which yield comparisons on a basis of sex. These studies fail to reveal any general memory advantage for either sex group. Superiority for certain material, however, receives considerable support. The tests were classified into five divisions: namely, those which evidenced marked male superiority, those with some male superiority, those in which no superiority for either group was found, some female superiority, and marked female superiority. In seven of the experiments where more than one type of testing material was employed, the sex differences were not in agreement; in these cases the divisions were treated as separate tests and each placed in its own classification. This provides a comparison of what may be considered as 33 tests. It is interesting to observe that the distribution which results assumes quite normal proportions:

<i>MM</i>	<i>M</i>	<i>M = F</i>	<i>F</i>	<i>FF</i>
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
2	9	10	11	1

This distribution is presented in greater detail in Table 1.

An examination of the material for which is evidenced some superiority of recall on the part of one sex or the other discloses significant differences. Prose, historical, lecture, or discussion material is found seven times within the *M* and *MM* groups, not at all within the equals groups, and but once is it listed under *F*. This one exception is by Bosset (5) who found some female superiority among sixth and seventh grade children for reading selections dealing with domestic life. That part of Bosset's study which dealt with historical selections revealed superiority for boys.

Conrad and Jones (8), in testing 746 adolescents and adults for the recall of a film from the Yale Historical Series, found male superiority for 22 items against female superiority for but one. Since the testing involved 40 items, a sex equality must have resulted for 17 items. Bird's experiment (3) using lecture material, Foster's (11) with prose, and Münster-

TABLE 1  
COMPARATIVE RECALL OF MALES AND FEMALES AS INFLUENCED BY MATERIAL

Reference No.	Investigator's name	Date	No. of ss.	Type of group	Type of material	
						++ Male      + Male      Equals      + Female      ++ Female
20	Moore	1933	51	College students	News items and names	
17	McDougall	1904	30	University students	Short time intervals	
20	Moore & Mather	1933	149	Participants	Popular songs	
3	Bird	1927	487	College students	Lecture material	
9	Dietze	1932	2789	Grammar school students	Reading selections	
11	Foster	1928	31	Preschool children	Prose	
5	Bosset	1929	95	6 and 7 grades	Historical selection	
8	Conrad & Jones	1931	746	Adults and adolescents	Historical and action moving pictures	
4	Boring	1916	44	Adults	Action moving pictures	
23	Münsterberg	1913	—	College students	Discussed observations	
21	Morgan	1917	125	College students	Incident	
6	Boydton	1931	225	Children	Birds and letter arrangements	
4	Boring	1916	44	Children	Action moving picture	
19	Meltzer	1931	132	College students	Experiences (P and U)	
2	Besterman	1932	42	College students	Seance phenomena	
20	Moore & Mather	1933	149	Auditors	Popular songs	
27	Strong	1912	40	College students	Advertisements	
1	Barkley	1932	—	College students	Advertisements	
7	Chamberlain	1915	120	3rd and 5th grades	Objects	
14	Keil	1894	—	High school and college students	Words and objects	
10	Finkbinder	1913	14	College students	Nonsense material	
5	Bosset	1929	95	6th and 7th grades	Reading selection—domestic life	
18	McGeoch	1928	580	9-14 years old	Incident and pictures	
8	Conrad & Jones	1931	746	Adults and adolescents	Romantic moving picture	
26	Pal	1926	4209	Children	Poetry	
6	Boydton	1931	225	Children	Clothing, numbers, figures, and syllables	
12	Gross	1930	—	5-11 years old	Picture	
15	Louttit	1931	380	College and 12-year-olds	Nonsense material	
7	Chamberlain	1915	160	8th grade children	Objects	
14	Keil	1894	—	Primary students	Words and objects	
24	Myers	1914	332	School children	Spelling words	
25	Myers	1914	596	School children	Word lists	
14	Unsigned	1891	70	High school and college students	Word lists	

berg's (23) with the discussion of observations all indicate male superiority. Münsterberg's deserves a classification here not because of the material recalled but because he seeks to measure the influence of discussion in the final establishment of recall judgments. He found women students less ready than men to alter first judgments after a critical discussion of the observed material.<sup>1</sup> From this he concluded that the traditional restriction of jury service to males was scientifically justified. One familiar with Marsten's (16) work relative to male and female juries will remember that the conclusions of these two investigators are not in agreement.

Dietze (9), in order to avoid the criticism that comparison of sexes by grades usually brings with it a bias of age advantage on the part of the boys, chose for his subjects paired individuals of the same age and grade. These he tested for immediate recall of three printed pamphlets each containing about 1000 words. He found the average memory of the boys ranging from 2.5% to 5% above that of the girls. It should be recognized, however, that the three articles, which discussed radium, the early Germans, and Sir Richard Arkwright, respectively, doubtless presented interest biases in favor of the boys. What would have been the relative standings had the articles been on lace or Florence Nightingale cannot be stated without further experimentation.

Two investigations gave marked male superiority in recall. McDougall (17) found that the error judgment of women in the recall of short time intervals was over twice that of men.

Moore (20) tested 51 college upperclassmen (25 males, 26 females) for the recognition of names and items that had occupied considerable headline space in recent years. With but two exceptions, the 25 men possessed scores above the median of the women's scores, and with but four exceptions the 26 women fell below the median score for men. No woman obtained a score as high as the upper quartile for men, and no man dropped to the lower quartile level for women. A further comparison indicates that for all items the males returned accurate answers in 42% of the subject-items; whereas the females returned accurate answers in but 25% of the cases. When one considers only the attempted answers, the recognition for both males and females obviously improves, becoming 71% and 61% respectively. On approaching the sex difference from the basis of a six-fold classification of items, it was found that the women recall almost as well as the men items involving scandal or notoriety, that their recall of items connected with sports and murders is about two-thirds as efficient as that of the men, and that for the items which concern national affairs, aviation, or science, their relative efficiency is less than one-half as great.

We now turn to the consideration of female superiority as suggested in

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<sup>1</sup>On the bases of other tests Münsterberg indicated a possible weaker resistance to suggestion on the part of girls (22).



the previous chart. Disconnected material such as lists of words, objects, nonsense syllables, object cards, and pictures characterizes nine of the twelve studies in the female group, is listed in five studies of the equals group, and not at all in the male group. Attempts to differentiate between objects of male and female interests have not given the anticipated results. Boynton's (6) experiment with 90 girls and 125 boys yielded an advantage for the girls with boys' dress materials and clothing as well as girls'. Keil (14) found that the marked superiority on objects and word lists evidenced by females in primary and grammar school years did not continue into the college level. Aside from the findings of Louttit (15) and those of an early investigator (13), the other experiments permit but do not verify Keil's exception of the college group. The recall of incidents and action pictures, while found in the male column on three occasions and in the female on two, suggests that whatever conclusions may be drawn must recognize possible age and interest differences. The three which favor males employ as subjects adults and adolescents; one favoring the females tests children nine to fourteen years of age, and the other uses a romantic movie. Boring's (4) study would lend emphasis to the view that sex differentiation appears at maturity.

At this point the findings of Conrad and Jones (8) are significant in that they indicate the specific items that revealed either distinct male or female superiority. On the basis of completion and multiple-choice tests the adolescent males revealed memory advantage over the adolescent females in such items as distance traveled, action within the ball game, and the new clothes which the hero purchased. The girls, on the other hand, recalled more efficiently women's wearing apparel, nicknames given to boys, and the amount of money the hero saved. Adult males surpassed their mates in information which concerned the interaction within the frontier army and between their leaders and those of the Indians, while the women recalled more accurately the hero's first bid at the shadow social, what the deacon said, and the hero's comment, "This time it's going to be tickets for two." Feminine recall was remarkably superior in the romantic drama and in the details of tender, pathetic episodes, while the males were superior in questions involving number and scenes related to fighting. The authors conclude that those of each sex excel in questions touching their own particular interest or training. This superiority, as in previous cases, is relative, since the similarity between the sexes is greater than the difference. The correlations ranged from plus .51 to plus .95.

The experiments which we have considered suggest specialized but not general recall differences between sexes. Where superiority is found we must not lose sight of the fact that the advantage enjoyed by one group or the other is in nearly all cases less than 20% and often nearer 5% or 10%. Consistent advantages have been revealed by the men for prose



and contextual material of a similar nature. Action also appears to be somewhat better recalled by the males. A consistent advantage for disconnected material is found on the part of the women. Other than this distinction between contextual and disconnected material, sex variations appear to be due to an experience complex. This fact should be utilized in future experiments, and the analyses made accordingly. Progress lies in the direction of defining and refining these differences and not in further studies attempting to establish general sex differences. When this is done, it is quite likely that some comparisons which are now made on the basis of sex will be reclassified on bases of experience and interest.

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## BOOKS

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SAMUEL D. SCHMALHAUSEN. *The New Road to Progress*. New York: Falcon, 1934. Pp. 409.

This is a collection of critical essays and propaganda rather than an organized scientific treatise. The author is very sure that all the "roads" thus far taken by civilized society have brought man into a most neurotic condition, sociologically and individually, and that the one effective remedy for all ills is communism. His criticisms of the old ethics, of religion, of the family, of sociologists and psychologists, are drastic and sometimes supported by facts. Notwithstanding his belief in Freud as the greatest of psychologists and his rather general use of Freudian vocabulary and mode of thinking, his criticism of Freud's psychology is more devastating, especially in its relation to sociology, than the criticisms of Freud's most rabid opponents. Schmalhausen seems to think himself almost the first person to realize the dominating influence of culture on the nature of individuals, and asserts in the preface that "this work marks a turning point in the history of modern psychology and psychotherapy." Informed readers will probably admit only that his criticisms may serve as a stimulus to the science of social psychology, the foundations of which are now being laid.

As a positive contribution to this new science and a demonstration of what will happen if society takes the new communistic road, this book is as reliable and scientific as a sign board advertising a new pleasure resort or a new remedy for all physical ills. The author's reasoning goes no further than to show that some of the present ills of society would probably disappear under communism. He naïvely takes it for granted that all social and mental disturbances would disappear, that progress would continue, and that no new ills would develop in a communistic state. He takes no account of the fact that Russia, the only civilized nation which has attempted to establish communism, has had to make many concessions to individualism. This raises the question of whether a wholly communistic society can ever be formed. The fact that in trying to modernize her industrial system, Russia has had to give engineers and administrators a higher social status than machine tenders, and thus begins dividing her people into classes, makes one question whether a scientifically dominated machine civilization is not directly opposed to a communistic social order. If complete communism is possible, would it not be in a population able to live in comfort without making much change in their environment? Such a population, (like the Samoans before the coming of the white man) might be happy, but would they be progressive?

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DANIEL SOMMER ROBINSON. *Political Ethics. An Application of Ethical Principles to Political Relations.* New York: Crowell, 1935. Pp. 18+288.

This book is quite different from the preceding one, being a well-organized treatise adapted for text book instruction. It is, of course, in a way propaganda for the present social order, but it appeals to the reason rather than the emotions. The author hopes for improvements through more consistent application of the old individualistic psychology and ethics to state affairs. His assumptions are philosophical and are not always discriminating as to what constitutes objective standards—as when he follows Hocking in regarding “level of public morality” as one objective standard for measuring the backwardness of nations. Like Whitehead and most philosophers, he gives ideas the chief role in social progress: e.g., extinction of slavery is supposed to be due chiefly to growth of humanitarianism rather than to many underlying economic and other factors modifying the behavior and rationalizing of men. To those who are satisfied with the old individualistic ethics and who wish to study how it may be more effectively applied to states in relation to individuals and to other states, the book will be welcome. The many references and the topics for discussion will also be helpful to students. It adds little or nothing to a scientific study of ethics and sociology.

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RUTH BENEDICT. *Patterns of Culture.* New York: Houghton, Mifflin, 1934. Pp. 291.

This excellent comparative study of cultures based chiefly upon three peoples, the Pueblo, the Dobu, and the Indian of Northwest coast of America, whose cultures as wholes have been described with some degree of completeness, should be warmly welcomed by scientific students of social psychology. The book is not like the preceding ones—theoretical—but an inductive study and interpretation of facts. It is an unusually acute, non-emotional introduction to a comparatively new field. It could be profitably supplemented by additional observations showing how these cultures are being modified by contacts with the white man's culture. Other comparisons of cultures should be made as soon as data have been obtained upon other cultures as wholes. Such studies will modify psychology and greatly help in the development of sociology and ethics into real sciences.

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